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Editorial Comments

The Fate of Hamburg.

During the closing days of July, Hamburg, some time chief port and shipping centre of Germany, was twice on successive nights heavily attacked by the R.A.F., with devastating effect on the docks and shipyards along the Elbe front, as well as on the city itself. Even the Germans admitted that the raids were a " spectacular success " for the British Air Force. What precisely was the amount of damage done we do not know, but it must have been sufficient to dislocate fundamentally, if not completely destroy, the major part of the facilities for shipping traffic and the elaborate cargo-handling equipment in the locality.

Hamburg had previously undergone persistent and periodic bombing attacks, though not on a scale anything like that of the latest assaults. The cumulative effect of all these onslaughts, however, must be considerable and it is a matter for interesting, and reasonable conjecture how far the port's activities will have been more than temporarily impaired. The question may even be asked, whether Hamburg is likely to survive the war as one of the world's leading seaports. When considering this point, we must recall that the fortunes of the place sank to an extremely low ebb during the last war, when the quays were more or less derelict, deserted by all the proud transatlantic liners which made the port famous. With the disappearance of all its carefully built-up commercial connections, the position then looked pretty desperate. Yet within a few years of the signing of the Armistice in 1918, the port made a most astounding and dramatic recovery of its trade and influence. It is true that it had not at that period received physical injury to anything like the extent which it has suffered and may continue to suffer in the present hostilities. Yet stranger things have happened, and just as we confidently expect our own ports to rise from their own happily less ruinous condition, it is far from improbable that the German port may likewise recover. The problem is discussed in our leading article this month and it can hardly fail to arouse a certain amount of interest in shipping and port circles.

There are several points in favour of an ultimate, if not immediate, recovery. In the first place there is the natural strategic location of the port as a gateway to the North Sea, at the mouth of great River Elbe, which, with its tributaries and artificial waterways, brought within recent years by an enterprising policy of constructional work to a high degree of serviceability, is a main artery of the Continent in direct communication with the whole interior of the Reich and extending into the domain of Czechoslovakia. Its only serious competitor in direct communication with the Atlantic is the neighbouring Port of Bremen, with its outport Bremerhafen, but these two stand on the banks of the Weser, which, although it taps the industrial region of Westphalia, has not the far-reaching ramifications and range of the Elbe. Moreover, Bremen has itself been ravaged by the R.A.F. to a degree scarcely less than Hamburg.

Then there are the traditions of the town, evidencing the indomitable courage and enterprise of its inhabitants, coupled with the fact of its resuscitation within the last generation. The Hamburgers, in fact, are a great trading community, whose forefathers built up a world-wide connection of which the Hanseatic league was the visible symbol. If the spirit which animated them is still alive, Hamburg is hardly likely to join the ranks of Tyre and Sidon.

Dockside Discipline.

The correspondence on the subject of alleged laxity of discipline among dockside workers at the Port of Liverpool, which is reproduced in this issue, should not be lightly dismissed as trivial and unimportant. Statements are made which, despite the emphatic denial of their accuracy by the Port Director, leave an uncomfortable impression on the public mind that all is not as it should be. In the national interest, it is desirable that there should be a strict and impartial investigation of the facts.

In saying this, we make no reflection on the personal administration of the Port Director, who has exercised his functions since his appointment with commendable energy and tact. But we imagine that, with nearly 30,000 dock workers under his administrative control, it is scarcely possible for him to be aware of everything that is going on and that, despite his watchfulness, certain abuses and malpractices may exist. It is better that these should be exposed than allowed to continue.

An American Port Controversy.

In this issue we publish the report of a Special Committee of the American Association of Port Authorities on Submerged and Reclaimed Land Legislation in the United States. It is a subject of great importance and involves the determination of a fundamental principle affecting the proprietary rights of a large number of port authorities in North America.

Editorial Comments—continued

We made a first reference to the matter in February, 1941; then in March last, another Editorial Comment emphasised the seriousness of the problem. At this stage it is unnecessary to recapitulate the circumstances *ab initio*, since our readers can easily recognise the main points of the issue at stake from a perusal of the present report.

From the evidence adduced, port officials in this country may well sympathise with the view taken by the American Association. Any interference with the title of land, whether in America or elsewhere, on the development of which, for port purposes, huge sums of money have been expended, can only result in loss of confidence in port investments and this could not fail to react prejudicially on port finance.

Naturally, this Journal can only concern itself with the purely economic aspect of the case: political questions in a foreign country lie entirely outside its province. Accordingly, we do not venture to offer any opinion on how this particular matter should be treated, but it is permissible (as also it should be sufficient) to point out the danger of disturbing public confidence in the ownership of port hereditaments.

The Port of Buenos Aires.

Operational methods at the Argentine Port of Buenos Aires have lately been the subject of some amount of criticism in South American shipping circles. There is, indeed, official recognition of the need for improvement in certain directions, for as far back as April, 1939, Mr. Ernesto Baldassari, Director General of Navigation and Ports in Argentina, in a lecture to the Argentine Society of Engineers, pointed out the necessity of remedying a number of deficiencies in the port services and formulated a design for the better accommodation of the coastal trade and passenger traffic which was described in the issue of this Journal for March, 1940. But the present agitation is more concerned with defects in methods of port operation than with the need for structural remodelling. At a public luncheon in Buenos Aires, Dr. E. Aguirre, President of the Buenos Aires Stock Exchange, voiced the dissatisfaction of the trading community with the existing state of affairs, which, he said, had been manifested in numerous complaints and protests concerning the complexity of port management and administration.

It was useless, he went on to say, to encourage the development of traffic and invest millions in the building of docks, depots, quays and railways if the vessels arriving at the port were chained to a slow and paralysing system, by multifarious charges and duties, by the innumerable departments which must be approached for every movement, by the slow and cumbersome progress of port work, and by the heavy charges for every form of service. All this cost a great deal of money, increased freight rates and so unnecessarily affected the basic cost of imports and exports. Buenos Aires had been notorious throughout the world as the most expensive and worst organised port, and not very long ago a well-known shipmaster had been heard to say that he preferred to face a German submarine rather than Buenos Aires exactions.

Dr. Aguirre's strictures have been supported by detailed accusations made in an article in the *Times of Argentina*, which as quoted from *Syren and Shipping*, runs as follows:—

"Few ports have been the object of so much study, but frequent changes in administration and the absence of co-ordination have resulted in chaotic conditions. Deficiencies, which are damaging enough during normal times, when there is an excess of tonnage, have become even more intolerable now during this world war, when costs have risen as to salaries, fuel and the price of ships. Every hour lost now means a considerable loss to shipping companies. When one considers the importance of shipping to Argentina, the seriousness of allowing discouraging delays may be realised. The motor ships *Ernebank* and *Olivebank*, arriving from Calcutta with jute, needed 20 days for the discharge of their cargoes; the *Danaholm* and *Hammaren*, Swedish ships, bringing paper to this country, needed 23 and 19 days respectively. In ports of other countries the same cargoes could have been discharged in 5 or 6 days. The *Irishbank* had the bad luck to enter Buenos Aires on Easter Thursday and could not begin the discharge of her cargo until the following Wednesday—6 days lost. Another example is that visits to ships by the health authorities can only be made between the hours of 11 o'clock and 3 o'clock in the afternoon; if a ship arrives after 3 o'clock everything must wait until 11 o'clock of the following morning. When there is bad weather, sometimes lasting two days, the medical authorities do not venture forth, and the ship must wait for better weather before the formalities are taken care of."

The remedy for this state of affairs, in Dr. Aguirre's view, is a return to the system of port administration which prevailed as the result of a law passed in 1910, when the services of the port were centralised in an autonomous body (subsequently suppressed) which worked with the aid of an advisory committee.

It is certainly an unfortunate and regrettable situation for which a remedy must be found without delay, if one of the leading ports in the South American Continent is to retrieve its reputation for enterprise and dispatch in maritime affairs.

The Institute of Transport and its Examinations.

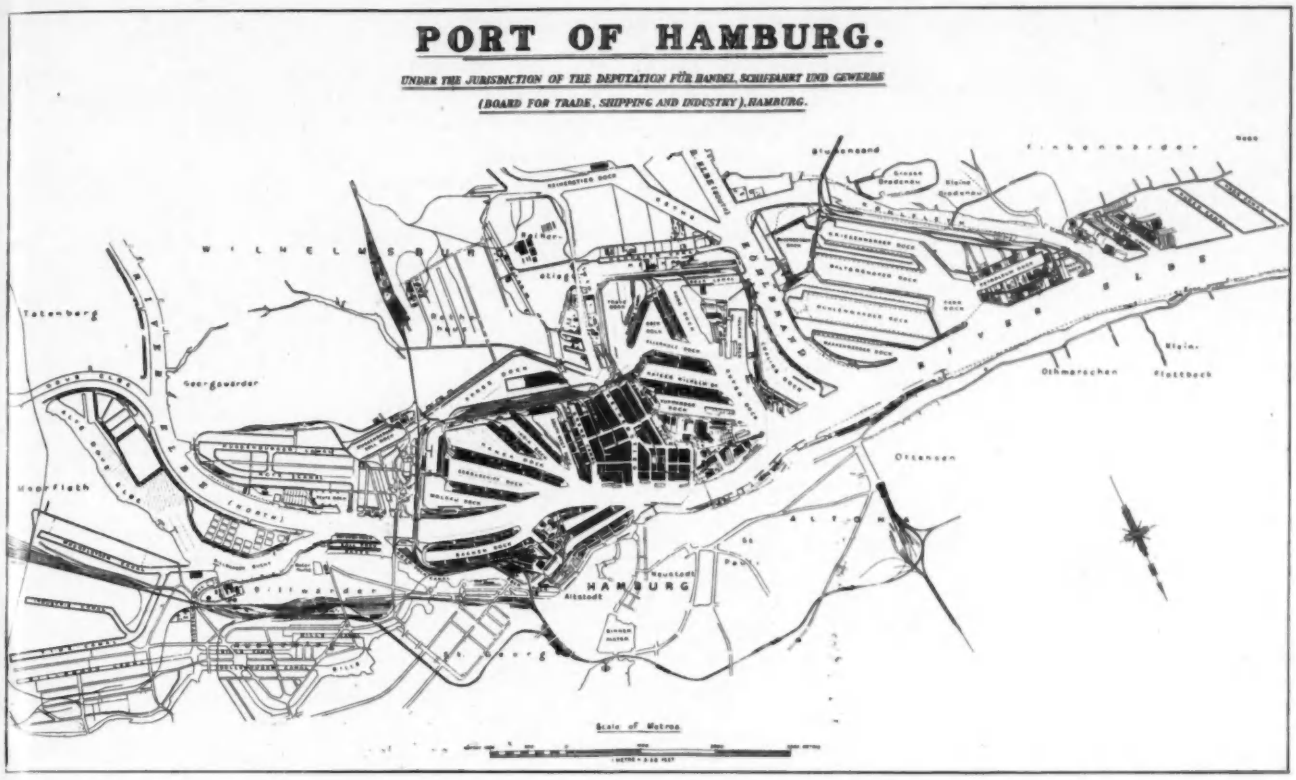
In the July issue of the Institute of Transport Journal the announcement is made by the President that, after December 31st, 1944, the Council will not, except in very special circumstances, exercise its powers to elect to Associate-Membership of the Institute without preliminary examination.

The grounds for this decision are that the examination scheme has now been in operation for 17 years, and that while testing by examination may not be an ideal system, yet " it still holds its own as an incentive to well-organised study and the Institute's examinations are the means whereby it endeavours to promote transport education along lines deemed best by the Council in the light of its experience." It is quite frankly admitted that in transport particularly, the passing of examination is not, and cannot be, the only test of a candidate's qualifications, but, on the other hand, the Institute regards it as one of its main functions to do all it can to encourage young men in the industry to advance their preparatory education for transport. Some disappointment that qualification by examination has not proved so popular as might have been expected is implied in the statement that " it has become evident that a definite lead in the matter is desirable ": hence the decision announced above.

It may be supposed that all our readers (who, presumably, are engaged on work involving some degree of technical knowledge of transport operations) have at some stage of their career, whether as examinee or examiner, realised the deficiencies in the ordeal by examination, yet no person of competence has, so far, been able to devise an alternative system free from objection of one kind or another. For want of a more efficient substitute, examinations must continue to be held and must remain as a primary test of knowledge and ability. Age and experience, in themselves, are an insufficient guarantee. Moreover, as pointed out by the Council, a systematised course of study is a highly desirable form of training for an executive or administrative position. The decision to make examination compulsory, therefore, must be accepted as the only logical course open to the Council to pursue.

While on the subject of the Institute and its examinations, we feel it desirable to make a passing comment on the indifferent support accorded to both by a field of transport which transcends in importance any other in an island community. Ports and shipping are the most vital considerations of this country and recent events have brought home to its inhabitants the painful truth of this statement. We believe we are right in stating that the Institute derives its least degree of support from the two sections in question. This is an extremely regrettable fact, for on ports and shipping depend, not merely the well-being and comfort of this community, but its very existence.

Surely, this reproach is one which should not be allowed to continue. It reflects on the wisdom and statesmanship of port authorities and shipping directorates that so little attention should be bestowed on the guidance of the junior members of their staffs in equipping themselves for the problems of the future. It has been represented as an explanation that the shipping industry is already catered for by special organisations of its own, such as the Chamber of Shipping, but the contention is fallacious, since the functions of the Institute of Transport are entirely distinct and lie in a different field.


PORT OF HAMBURG.
UNDER THE JURISDICTION OF THE DEPUTATION FÜR HANDEL, SCHIFFAHRT UND GEWERBE
(BOARD FOR TRADE, SHIPPING AND INDUSTRY), HAMBURG.
HAMBURG
Scale of Metres

The Port of Hamburg

Its Past, Present and Future

By FRANK C. BOWEN.

War-time Experiences

NO port in the world has been bombed so thoroughly and effectively as Hamburg—77 raids in the first 24 months of the war and many since—and although the President of the local Chamber of Commerce announced his belief that it would recover to be the greatest port for Central Europe, and that its future would be even more strikingly successful than its past, the general opinion is that this estimate is quite unjustifiably optimistic and that the port will be in eclipse for many years after the war at least. Only time can prove which of these opinions is correct, but it has to be remembered that Hamburg has already recovered on many occasions when its rivals were pleased to consider it out of the running. The question is whether changed conditions will permit history to repeat itself, or whether the factors which made for the prosperity of the port through many centuries are now ineffective.

The permanency of modern methods of warfare against a port has not yet been tested, but even the Nazis cannot deny that for centuries the wonderful powers of recovery were largely owing to the spirit of the big Jewish element, pertinacity in adversity being the age-old characteristic of their race, and this element is now eliminated.

Early History of the Port

As far as definite records go, Hamburg originated in the erection of a fortress by Charlemagne against the Slavs in 808, using the hill between the Elbe and the Alster, but it is believed that there was an even earlier settlement. It soon attained ecclesiastical importance and became one of the main terminals of the Overland Route from the East by way of Venice, the Brenner Pass and Augsburg. Both ecclesiastical and commercial prosperity attracted the Norsemen and the settlement was constantly devastated. In the early days it was purely a transit port, but it developed its own trade as the local industries were worked up, and by the end of the Thirteenth Century it was doing an immense business in locally-brewed beers. This trade was one of the mainstays of Hamburg commerce for centuries, and as the local brewers were the only ones who seriously studied the problem of keeping beer sweet at sea, in days when it was the sailor's invariable drink, shipowners from practically the whole of Northern Europe bought it.

The first commercial concessions came from the Emperor Frederick I. in 1189, in return for funds for his crusade, and these included self-government, exemption from tolls, fishing rights and many other privileges. The craft guilds soon grew very powerful, but they were excluded from the government for centuries. A very large part of its transit trade then came through the Flemish merchants. Hamburg co-operated with Lubeck from the Twelfth Century, the treaty between the two ports signed in 1255 being the real commencement of the Hanseatic League. The trade route between Hamburg and Lubeck handled an immense traffic from Flanders to Russia. Even in those early days a great factor of Hamburg's success in the Hanseatic League was the willingness of its burghers to shoulder the responsibility for the conservancy of the River Elbe and keeping it safe from pirates. The methods that they employed against pirates were not pleasant, but they were effective.

The Hanseatic League Period

Throughout the Thirteenth Century the city steadily added to its territory until it controlled a very large part of the Elbe. It always had the reputation of saving itself from the aggression of

Port of Hamburg—continued

powerful neighbours by clever treaties which generally gave the port a big advantage in the long run; sometimes it over-reached itself, but not often. Early in the Fifteenth Century the craft guilds forced the patrician merchants to give them some share in the government and the progress of the port was accelerated. For twenty years it held Emden and a big slice of Eastern Frisia, always taking care of its own interests and compelling the whole of the Lower Elbe grain trade to pass through the port. It was made a free city by the Emperor Maximilian I. in 1510, and when the Hanseatic League began to decline very soon afterwards, Hamburg was the first to dissociate itself from any of its rules which were considered to be hampering and it developed its own international connections.

The English Merchant Venturers were admitted in 1549, after they had been expelled from Antwerp and the influx of a large number of Jews and Protestants seeking safety from the Spanish Empire, helped to work up a big trade with Spain, Portugal, Italy, France and Holland, in addition to other ports in Germany which had been outside the Hanseatic League. The famous Exchange was founded in 1557, admitting Hanseatic, Flemish, English and Scandinavian merchants, and revolutionised trade by saving its members the trouble and expense of going overseas after their business: it established a big agency which was exceedingly well organised. The enterprise of its merchants, largely Jewish, at this time, was conspicuous; among other things they established the postal system with the rest of Germany and an exchange and banking law.

Nicolaifleth, the mouth of the River Alster. The nucleus of the present Harbour.

Naturally this expansion was not contrived without bitter jealousy from neighbouring powers, especially Denmark. That country was constantly threatening Hamburg and frequently had to be bought off, but in 1768, the Danish left bank of the Elbe was sold to the Free State and formed the foundation of the modern port. The Treaty of Paris, which acknowledged the Independence of the United States in 1785, meant an immense expansion of Hamburg trade, not only by opening up a new market for German goods, but also because many English merchants used it in order to circumvent bitter American feeling. The French occupation of Holland in 1795 gave it a considerable part of the former Dutch trade, but against this was the universal insecurity felt after the French Revolution. Napoleon plundered it thoroughly, regarding it as part of England, and ruined its trade while he was in power.

The Nineteenth Century

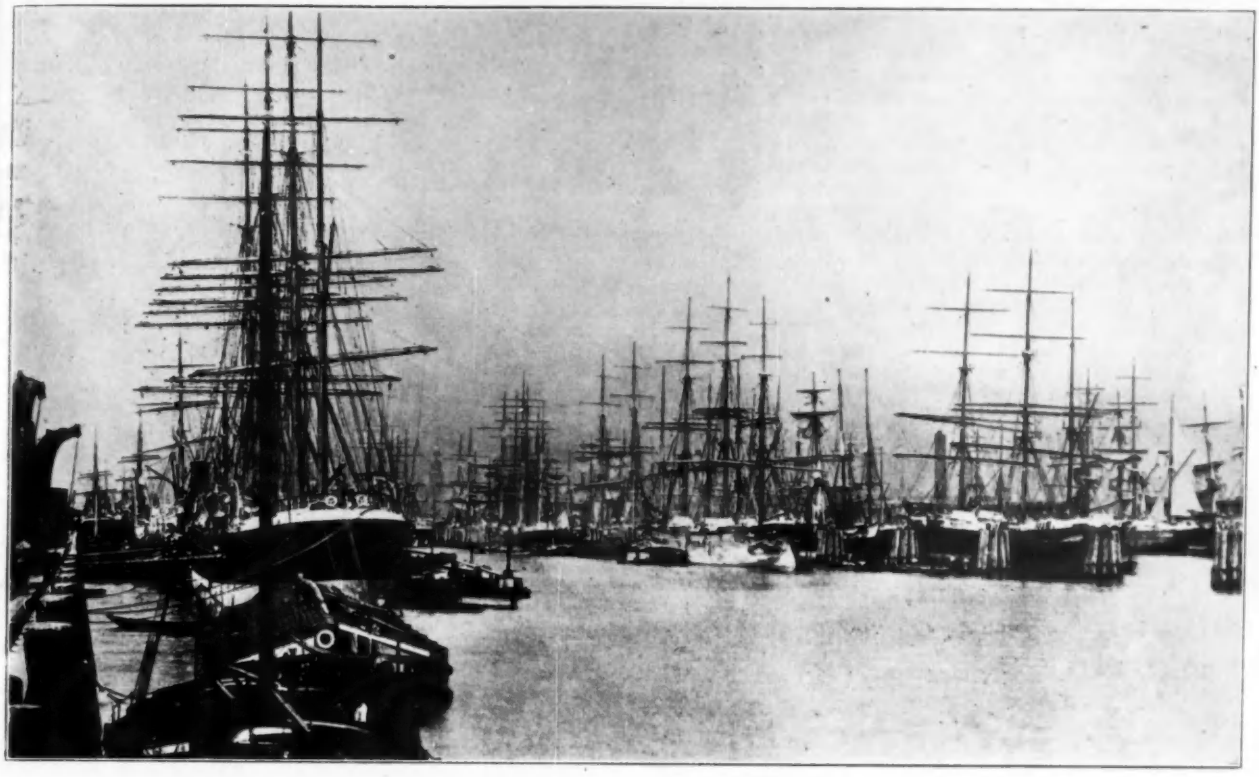
During the period of recovery, the Hamburgers were of little importance as merchants but rapidly rebuilt their connection as forwarding agents for other centres in Germany against big handicaps. The town was a traditional supporter of free trade principles, as was natural from its connections, so that its association with the remainder of the German Empire was contrived slowly and with the greatest care. It joined the North German Confederation in 1866, and in 1871 it became a constituent state of the New Empire without losing its independence. The Elbe was declared free of toll in 1870, from which great benefits were obtained.

It joined the German Customs Union in 1888, but carefully excepted the land covered by the port and earmarked for future extensons. This was already under conversion as a free port, the walls being completed in 1888. Between 1868 and 1873 improvements had already cost 7 million pounds sterling, to which the Reich Government contributed 2 million pounds. The cost of the free port was additional, and 24,000 people were turned out of their homes to build it. Its establishment greatly accelerated the handling of cargo and promoted industries in the neighbourhood to deal with the raw materials imported, for no duties were payable if they were re-exported as semi-finished. Customs formalities between Hamburg and non-German countries were reduced to the minimum.

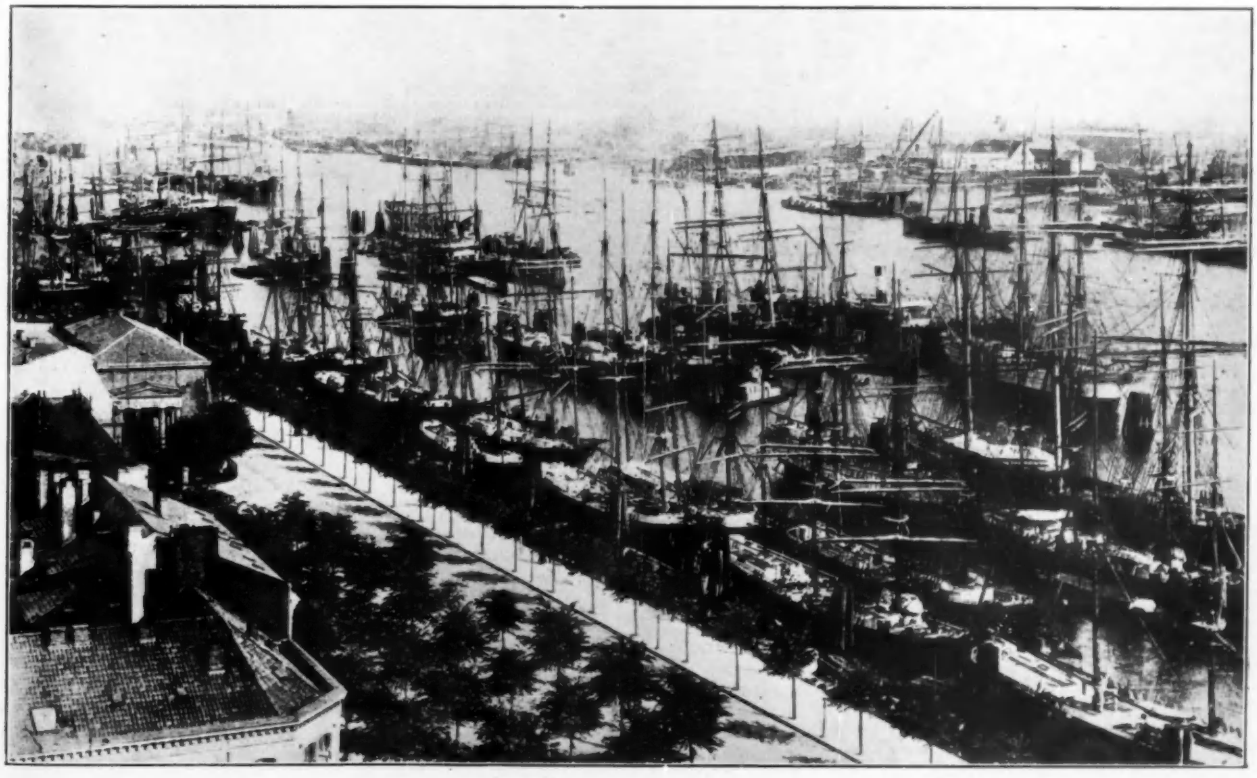
Before the free port came into existence, however, great progress had been made to overcome the handicaps of the Napoleonic eclipse. Steam was first introduced on to the Elbe in 1816, and the first overseas steam service was established to London ten years later. Immediately after the South American Wars of Liberation great efforts were made to foster trade with the new republics and Hamburg has never lost its Latin-American connection. The very small difference between high and

Sandthorhafen, the oldest quay in the Port of Hamburg.

Port of Hamburg—continued



Sailing Ship Harbour at Hamburg, showing dolphins, a conspicuous feature of the port.



Hamburg in the days of sail.

Port of Hamburg—continued

low water on the Elbe was a great help. Progress was checked by the Great Fire of May, 1842, but the city was rapidly rebuilt. It became the principal port of German emigration, although the fear of losing conscripts caused that trade to be severely checked until after the Franco-Prussian War. The Hamburg-American Line was founded in 1847, on a very small scale at first, but rapidly growing, and as the increasing size of overseas ships made it uneconomical to run first-class tonnage to the Baltic a transhipment trade grew steadily, to be rapidly increased when the Kiel Canal was cut.

Until the middle of the Nineteenth Century, the port had no basins and few other facilities; ships handled their cargo by lighter at the long lines of dolphins which are still a feature on the banks of the narrow canals. A huge number of warehouses were situated on the banks of the narrow channels, which were very suitable for barges, but which started innumerable epidemics through their foulness. When more up-to-date facilities were planned, the policy was to raise the walls of the existing bye-harbours rather than build docks with gates, an economical system permitted by the very small rise and fall. The Sandtor Quay, the first in the port, was opened by the State in August, 1866, and the State long retained possession of all the quays built, not even renting them to shipping companies until the 'nineties. The first railway bridge across the Elbe was built between 1868 and 1872; it permitted a big improvement in the connections with the rest of Germany and the railway facilities on the quays were very carefully thought out. The principal new outlet of trade, as apart from developments, was the opening up of the African business in the 'eighties and the port has guarded it jealously ever since.

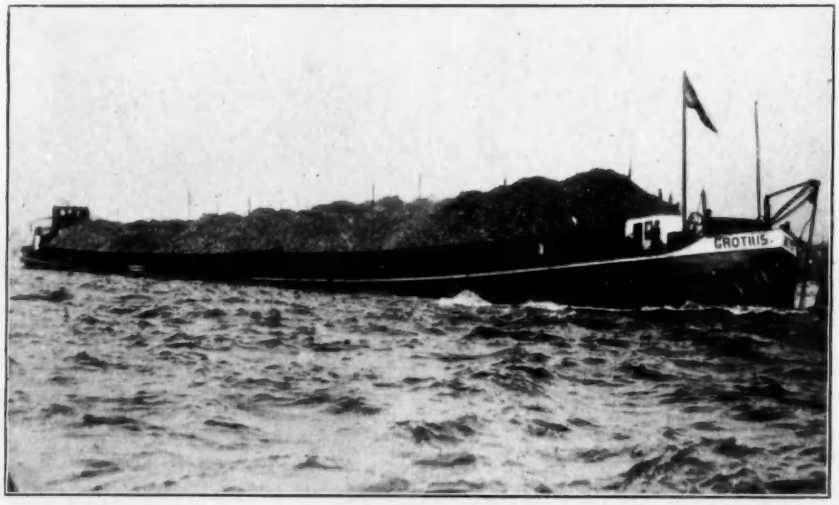
A Canal in the Warehouse Town, Free Harbour Area.

Cuxhaven.

For the biggest ships, Cuxhaven was slowly developed in the late 'sixties and early 'seventies, beginning with the union of two villages which had belonged to Hamburg since the end of the Fourteenth Century, but which had been of little importance owing to the shallow harbour. In the 'eighties the Hamburg American Line required a passenger terminal downstream and Cuxhaven was chosen, connected with Hamburg by a 64-mile railway. Landing stages and a 22-acre dock were built, although the cargo-handling facilities were later wasted because the improvements in the Elbe permitted big ships to go right up to Hamburg itself. The harbour remained Hamburg property when the town was transferred to Prussia, the Old Harbour to the West being used by coasters, the long and narrow Fishing Port in the centre being opened in 1892, and the New Harbour, generally known as the America Harbour, to the East being built between 1891 and 1896.

Rivalry of German Ports

Every step in the prosperity of the port was made in face of the jealousy and active opposition of its rivals. The enmity of Bremen is a legacy of Hanseatic days and is never far below the surface in spite of all the efforts of the central government. The Bremen people regard themselves as the patricians of trade, the Hamburgers as vulgar and unscrupulous profiteers, and Hitler's attempts to combine the North German Lloyd and the Hamburg-American Lines have split on this. The almost open exultation of each port at the air raid damage suffered by the other is significant. Prussia also was very jealous of Hamburg's independence and attempted to absorb the Free State for many years. It promoted ports in its own territory to compete with Hamburg, one of the most striking being Emden, which was artificially encouraged with waterway connections in order to take the Rhine trade. After the late war, negotiations were started to put an end to this rivalry, but they were constantly broken off. Hamburg found its area inadequate while there was plenty of undeveloped land in Prussian territory, including the island of Hohe Schaar, which could be included in the Free Port. Prussia would only cede territory if the Free State ceded Cuxhaven and paid a heavy annual rent for the benefit of Altona, Harburg and other Prussian ports, so that it was a long time before matters were arranged. Kiel, Stettin and Lubeck were equally jealous of Hamburg's Baltic connection.



The "Grotius," one of the large barges which move immense cargoes of coal on inland waterways.

All the other German ports constantly complained that Hamburg was unscrupulous in its methods of obtaining business, and British interests had equal reason to believe this from time to time. Hamburg was the leader of the iniquitous "control stations" system which, using the cholera outbreak of 1892 as an excuse, established quarantine stations through which all the transit emigrants from Russia and other parts of Eastern Europe had to pass. Those who had bought tickets by the British companies had infinite trouble, were often turned back altogether and in any circumstances

Port of Hamburg—continued

were subjected to strong pressure, amounting almost to blackmail, to transfer to German companies

Hamburg's prosperity must necessarily depend on its hinterland, which has been vastly increased by artificial means. Firstly, there is the wonderful network of railways carefully planned by the Reich; from Hamburg there are five main lines to Berlin, Hanover, Bremen, Kiel and Lubeck. The trade from Central Europe is largely dependent on the rates quoted by the State railways, which the Reich can fix as low as is necessary to combat the competition of Trieste and other ports, but it has always been apt to demand its pound of flesh in return. Preferential rates have generally been given to Swiss trade in competition with Antwerp and Rotterdam. The inclusion of Harburg in the Port of Hamburg has been a great advantage in the South, South-east and Westerly sections. Czechoslovakia was brought into Hamburg's hinterland by the Treaty of Versailles, which provided for a free port, but in spite of the treaty it was a long time before the handicaps deliberately raised by other ports of Germany could be overcome.

Inland Waterways

The inland waterways are even more extensive than the rail connections, and have always attracted many cargoes which are unable to stand the high cost of rail transport, with the inevitable result that the railways have always opposed their construction as far as possible. The Elbe and a tributary connect Hamburg with Czechoslovakia, navigable as far as Prague. The Elbe is connected with the Vistula by way of the Oder and its tributaries and a network of canals bring cargo from many other quarters. The Mittelland Canal connects the Elbe and Weser with the Rhone and was built in the 'seventies, although big extensions have been put in hand by the Nazi party. These provide direct connection between all Germany, except the Danube, which is provided by other waterways. The Elbe-Trave Canal was built at the end of last century by Lubeck with the help of Prussia and takes barges from the Baltic, while the Kiel Canal accommodates the bigger ships. The vast Hansa Canal Scheme has been discussed for years, and when it was revived in 1933 the cost was estimated at £15,000,000. A start was finally decided upon at the end of 1937, the first portion linking up Hamburg and Bremen, and if it is ever completed, according to plan, it has infinite possibilities.

In addition to its purely shipping services, Hamburg has shipbuilding on a large scale, and many other industries which help the port. The importation of raw materials through the Free Port has encouraged the settlement of industries in the Free State, with great advantages from the fiscal policy. Beer, biscuits, canned foods, tobacco and ready-made clothing have been prominent, and the area is also known for sugar refining, coffee, chocolates, machinery, furniture, musical instruments, scientific instruments and chemicals. The shipyards not only build a large number of vessels, up to the biggest in the world, by Messrs. Blohm and Voss, but are also prominent for repair work which, in normal times, brings in a large number of foreign orders. The yards have the reputation for quick work and reasonable price, although they have to fight hard with the Dutch.

Recovery after Last War.

Hamburg's prosperity was very hard hit by the late war and still harder hit by the Treaty of Versailles, but those in authority took the greatest care to keep the equipment of the port perfect in the hope of eliminating British competition. They started improvements to the limit of their resources immediately after the Armistice, and Hamburg shipping men were the first to take steps towards recovery by putting their experience at the disposal of their late enemies, concluding alliances with British, American and Belgian companies. The Czechoslovakian facilities provided by Versailles were difficult to obtain owing to constant interference and intrigue by Berlin, while the Hamburg merchants were very anxious to arrange them on account of the competition of Trieste. Full advantage was taken of the fall of the mark, although the area was hard hit when it got out of hand and finally disappeared altogether. The few years that followed the war were very anxious, but the difficulties were overcome remarkably quickly, with the result that the quay accommodation proved inadequate by 1925. Some trade had admittedly been lost; for instance, Scandinavian shipping handled much more of the cargo, especially Transatlantic, which had formerly been sent through Hamburg, but there was consolation in other directions. The Southern Central European states found Hamburg as attractive as Trieste, which had monopolised the business before the war, while the high cost of the European Danube Commission forced up the dues of the Danube ports and helped Hamburg considerably. In the second stage of the slump, from 1929, Hamburg lost less of its trade than most of its rivals, but it was rather slower in the purely commercial recovery. Even in the most anxious times, great improvements were carried out, many of the latter with the assistance of the Nazi Government, whose temporary policy of self-sufficiency had hit the port hard.

The Nazi Regime

Hamburg has had to use a good deal of her old technique in dealing with powerful enemies since the Nazi regime has come into power. Hitler has often shown his dislike for the Hansa in general, for the pride of each free city in its individual history undermined his ideas of a United Reich, their boast of being Hanseats rather than Germans was almost treasonable, while the traditional Hamburg sense of humour was hard to understand, but very galling to his pride. Two other points were that the great part of the prosperity of the port was admittedly based on the ability of Jews like Albert Ballin and that there was an historic connection between Hamburg and Britain, although its actual strength has been doubtful for years. In due course, the Free Cities were brought completely into the Reich and the Nazi regime started by sweeping away many of the historic institutions, rights of labour, etc. On the other hand, it put an end, on the surface, at least, to the enmity of Prussia which had caused so much trouble. Quite early in the present war, Hitler announced that Stettin was to be the premier port of Germany, in the place of Hamburg; practical men did not take him very seriously, but the Hamburgers were bitterly offended. It was more dangerous when he decreed that a considerable part of the trade of the port, conspicuously the African connection, was to be transferred to Bremen. Rival ports, both inside and outside Germany, have not shown any sympathy.

Since the outbreak of the present war, Hamburg has had a very trying time. In addition to the raids, which have caused great moral as well as material damage, and the almost total stoppage of overseas trade, the financial results of the war work which it has done do not appear to have been at all satisfactory to business men. The channel of the Elbe has been severely restricted by war wrecks through air bombs and mines, a great deal of the traffic on which it relied in the early days of the war has been removed to Stettin and other ports, and the foreign labour which had to be imported, largely from the occupied countries, seems to have been far from satisfactory. There is evidence of a great deal of sabotage and reports of considerable rioting over the food situation, although such reports have to be accepted with reserve. There can, however, be not the least doubt that the situation of the port has been very unhappy since 1939, and it is very difficult to access the possibilities of post-war recovery, with an immense amount of damage to be repaired, general distrust of all things German, and a bitter hatred by the peoples of the occupied territories to whom the port was accustomed to look for a good deal of its most profitable trade.

Prevention of Congestion at U.S. Ports.

The announcement has been made in Washington by Mr. Joseph B. Eastman, Director of the Office of Defence Transportation, that the United States Government has decided to remove cargo for shipping from any port in the United States, if and when such action is necessary to relieve congestion and ensure the expeditious movement of troops and war materials. It is explained that this order does not imply the existence of any serious port congestion, but is designed to relieve certain ports of cargoes in hand or in store, many of which were originally destined for foreign countries now occupied by Axis forces.

Correspondence

To the Editor of "The Dock and Harbour Authority."

Scottish Canal Development

Dear Sir,—

The correspondence in your columns on the subject of Canal Development is timely.

(1) Generally speaking, canals in Great Britain have been very much neglected. Thirty years ago I prepare schemes of improvement to the Trent and Mersey Canal, but nothing of importance was done.

(2) The late Mr. Pick, of Underground Railway fame, was instructed to report on the canals of England with a view to their betterment, but I have not observed that this applied also to Scotland.

(3) His report has not been published, but it is to be hoped that, in a large measure, the recommendations made by Mr. Pick will be put into effect.

(4) Post-war reconstruction and development should include a consideration of the needs of British Canals.

Whenever Royal Commissions have been set up to enquire into the possibilities of British Canals as a means of transport their verdict has been invariably in favour of their betterment and greater use being made of such waterways.

A Royal Commission suggested, in 1909, that a Waterways Board be created in which the main canals should be vested. They suggested that canals owned by railways should be acquired and that State and private financial assistance be given for the acquisition of important waterways.

But nothing happened.

The late Mr. Neville Chamberlain, when head of another Canals Commission, repeated this 1909 recommendation—that main canal groups should be financed by public trusts and partly by the State.

Nothing was done.

The last Royal Commission to consider the co-ordination and development of transport reported to Parliament in 1930:—

" So necessary do we consider amalgamation of existing canal companies that we are of the opinion that, failing the submission of voluntary schemes within a short period, the Minister of Transport should take steps to set up Public Trusts to acquire canals." Nothing was done.

On March 28th, 1940, Captain Wallace told the House of Commons that the Government had offered some measure of financial assistance to the canals if plans for carrying more traffic by canal could be formulated.

To-day the canals are still carrying only a tithe of what they could carry.

It is suggested that two projects in Scotland present themselves for serious consideration, namely, the Clyde-Forth Ship Canal and the enlargement and betterment of the Caledonian Canal, about both of which considerable public interest has been evinced.

When speaking to the St. Andrew Society, Glasgow, Mr. J. Jeffrey Waddell, the well-known architect, stated that, " in the opinion of Admiral Sir Barry Domvile, a Clyde-Forth Ship Canal is of vital importance as the Fleet would gain a valuable strategic short-cut by using it."

" At present the Navy and mercantile shipping from the West Coast ports to those on the East Coast and Baltic, is handicapped with the long, dangerous voyage round the North of Scotland from West, eastward, when it might have a safe passage across Scotland in 4½ hours, not only to the East Coast ports, but to Norway, the Baltic, and other important centres."

A letter addressed to *The Times* on 15th March, 1939, by Admiral Sir Edward Inglefield, supported what has been said by Sir Barry Domvile:—

" With the much improved foreign armaments of the present day a Clyde-Forth Canal has become more than ever an essential factor in our sea power. All opening to the westward from Rosyth to the sea, has now become an imperative necessity.

" From whatever aspect it may be viewed, either Naval, commercial or financial, the construction of a Ship Canal from the Forth to the Clyde seems a very necessary and promising enterprise."

The Caledonian Canal, already in existence, very definitely needs betterment in the best interests of shipping and commerce. Its restricted utility at all times, but more especially during the last and present war, has been fully demonstrated.

The waterway is kept in good condition, but the size of the locks and canal cut restricts the dimensions of vessels to the following limits:—

Length	...	...	...	160-ft.
Breadth	...	...	...	36-ft.
Depth	...	...	...	14-ft.

War has placed a ceaseless drain on the cream of man-power in the sparseley occupied Highlands which must be replenished if the country is to continue to have the advantage of the qualities of a hardy virile race, well-equipped by Nature for the stern battles yet to be fought on the post-war front.

Schemes of far-reaching importance and magnitude should be undertaken whereby the native population will be reasonably sure of a satisfactory economic future within its own area.

Planning ahead is essential, for it takes considerable time to complete detailed plans for big construction work, and they should be put in hand forthwith and so be ready to serve the urgent purpose of providing employment for those released on the cessation of hostilities and thereby assist in overcoming the costly and pernicious non-productive " dole " system.

The advantages to be gained from Inland waterways has been realised in our Dominions, U.S.A., Russia, and several other countries in Europe.

Germany has her Kiel Canal which, it is claimed, doubled the mobility of her fleet.

The U.S.A. has its Panama Canal; Greece, the Corinth Canal; France and Belgium have built up an extensive system of canals since the last war. Sweden—The Falsterbo Canal on which work to the value of approximately £685,000 was expended in 1940, and the Ricksdag has this year been asked by the Ministry of Commerce to authorise an expenditure of approximately £2,455,000 (average rate of exchange in 1940). Canada has built the Welland Ship Canal connecting Lake Erie with Lake Ontario, and quite recently the Government of the U.S.A. and Canada signed an agreement in order to reap the full benefit of the Welland Ship Canal by constructing the St. Lawrence River navigation and power project from Lake Ontario to Montreal, so providing a waterway 27-ft. deep, enabling ocean-going vessels to navigate from the Atlantic to the head of the Great Lakes.

Had the Caledonian Canal kept abreast of the times its restricted utility during the present war would have been overcome.

The passage from sea to sea is 60 miles, and takes in the summer time about 16 hours, and 1½ days in winter when the Canal is only navigable during daylight and no traffic is allowed to move on Sundays, unless by special emergency arrangements.

Were it reconstructed to take ocean-going vessels, drawing, say 27-ft. of water with, say, three suitable locks at each end instead of 29 at present existing, there would be an enormous saving in time over the north-about passage.

What a great boom it would have been in these tragic days if larger vessels could have saved the circumnavigation of a long hazardous voyage via the Pentland Firth and found safe and commodious passage across the island of Great Britain from Loch Linnhe to the Moray Firth.

Actual reconstruction would be necessary only over a length of approximately 28 miles, for Loch Ness and Loch Lochy would be utilised, as at present, with their striking characteristic immense depth over a length of about 32 miles of the total of the waterway.

All vessels going from Ireland or the West Coast of Britain, to the East Coast of the island, to Holland or to the Continent of Europe, north of it and vice versa, together with vessels trading between the East Coast and North America, must either pass through the English Channel or go north-about, that is, through the Pentland Firth or through the Sounds of the Orkney Islands.

From this view of the subject, it would appear that a communication such as described between the North Sea and Atlantic, would be shorter and more secure, both from the dangers of the sea and from enemy action, also more certain in all seasons than by the Orkneys, and prove more acceptable to all vessels capable of passing through it.

Correspondence—continued

There are few descriptions of trade or manufacture that might not be prosecuted beneficially and developed permanently alongside the course of the Canal, were improved facilities given and plenteous power made available at low cost.

As the actual length of the suggested betterment of the Caledonian Canal, as also that of the Clyde-Forth Canal, approximates that of the Welland Ship Canal, Canada, it may be interesting and not out of place to give a few details of the latter, which will afford an indication of what such a work involves and the enormous quantity of materials, etc., used, by which manufacturers and suppliers in their respective trades would participate during construction.

The first Welland Canal was completed in 1829 with 39 wooden locks each 110-ft. in length; 22-ft. in width with 8-ft. of water on the sills.

An improvement was effected and completed in 1845 by lengthening the locks to 150-ft., width to 26½-ft. with 9-ft. of water on the sills.

In 1887 a further improvement was completed when the length of locks was increased to 270-ft. width to 45-ft. with 12-ft. of water on the sills.

In 1901 the total tonnage passing through the Canal was 620,200 tons of water-borne freight, carried in vessels limited in length to 255-ft. In 1913 this had increased to 3,861,000 tons.

In 1913 the great undertaking of making the Canal suitable for ocean-going vessels was put in hand with seven locks only, each providing a useable length of 820-ft., a width of 79-ft. with 30-ft. of water on the sills.

Owing to serious interference by the Great War causing shortage of material and labour, it was not completed and opened until 1933. During the navigation season, 1940 (approx. 8 months), 12,909,597 tons of freight passed through the locks.

There were as many as 4,000 workmen engaged on construction at one time. Twenty railway and highway steel bridges were built spanning the canal, of the Bascule single, double rolling and vertical lift types, with a clearance of 120-ft. above water level when fully raised.

Its length is 27.7 statute miles. Width of canal prism at bottom 200-ft. and 310-ft. of water line.

Total rock excavation—9,183,000 cu. yds.
Total earth excavation—52,409,000 cu. yds.
Total watertight embankments—4,922,000 cu. yds.
Total concrete (all classes)—3,614,000 cu. yds.
Total reinforcing steel—18,500 tons.
Total steel sheet piling—27,600 tons.
Weight of metal in lock gates—24,000 tons.
Total weight of metal in valves of locks and weirs with machinery—5,000 tons.
Cement used in concrete cost, approx. £2,505,000.
Value of plant employed on construction, approx. £1,500,000.
Total capital cost, approx. £32,258,000.

Permanent employees required for operating the New Ship Canal, including Head Office organisation and Stores Dept., are 300 only.

Monetary values are expressed in pounds sterling by converting dollars into pounds at the present-day rate of New York Exchange. Weights given are American short tons of 2,000 lbs. to the ton.

It is not suggested that the conversion of the Caledonian Canal into a Ship Canal would absorb so much material, etc., or cost as much as the Welland Ship Canal. The expenditure would nevertheless be great, but a very large proportion of it would be spent on site wages and on the production of the requisite material, plant, etc., and so find work for thousands who might otherwise be a charge on the State.

As evidence of the national benefit resulting from the Welland Ship Canal, it may be noted that no tolls are charged to-day for the use of any canal along the connecting waterways of the Great Lakes or along the entire length of the St. Lawrence River, and whatever facilities are provided by Canada and the U.S.A. are given freely and without hindrance to each other's vessels.

Whatever may be the cost of the suggested betterment of the Caledonian Canal or the construction of the Clyde-Forth Canal, at least 45 per cent. of the amount would apply on site wages and 33 to 40 per cent on material, plant and equipment. It therefore would be worth while, for, apart from the shipping and commercial advantages which would accrue after completion, it would during construction find work for thousands of deserving men who will be looking for employment on the cessation of hostilities.

Relative to the question of cost, an important point is that, in view of the great age of the under-water works of the present canal and the primitive facilities available at the time of their construction, a very large expenditure will, at no far distant date, be involved in their replacement, when it would be folly to adhere to the present inadequate dimensions.

Lady Glen-Coats, when speaking to the Women's Council of the Scottish Liberal Association in Glasgow on 1st May, 1941, seems to sum up the post-war situation very appropriately in these words:

"Looking back on the last war, we foresaw no cessation of hostilities in 1918; yet, in the matter of weeks only, armistice had arrived, and now, here we are again, in another and grimmer struggle, that might, for all we know, end quite as abruptly, and present more formidable problems for the future. However, laudable regional plans may be, that will only be tinkering with the problem and not getting down to the evils, old and new, that must progressively increase, as the decline of Scotland's prosperity continues."

W. H. HUTCHINSON, Assoc.M.Inst.C.E.
(For 10 years Resident Director in Canada on three sections of the Welland Canal).

Park House, Dingwall.
August 4th, 1942.

To the Editor of "The Dock and Harbour Authority."

The Grand Contour Canal

Dear Sir,—

Mr. C. A. Wilson appears to have been mistaken in his letter published in your issue of July, 1942, viz., that Mr. Pownall has not mentioned "anything about tunnels" in his brochure on the Grand Contour Canal. Places where tunnelling will be required are indicated in chapter II. of the brochure, and in the approximate cost of the scheme given on page 24, provision is made for 35 miles of tunnelling. The tunnels should not involve any insuperable engineering difficulty. It will be merely a matter of slogging along.

As regards water supply, the canal will be practically a contour catch water chain. From the areas of catchment intercepted by the canal, the average and the lowest rainfalls on them, an estimate of the available supply can be made. The critical area is from Leighton Buzzard to Market Drayton. The most favourable supply will be from the Pennine area, from the upper water of the Wharfe, the Ure, the Swale and the Tees. The supply will not be available from this area for the Midlands until the long Pennine Tunnel is completed.

The canal has great possibilities, and in a scheme of this magnitude, the indirect benefits must be taken into account. Its effect on posterity, in view of the strong competition in the markets of the world that is likely to arise, necessitating efficient and economic transport, should receive the greatest consideration in post-war schemes.

Communications make traffic, and not traffic communications.

Yours truly,
J. M. LACEY.

Quest Cottage,
Herne Bay, Kent.
27th July, 1942.

The Outbreak of Smallpox in Glasgow.

The medical authority of the Port of Glasgow has been greatly exercised by the recent outbreak of smallpox in the city, traced to the arrival of a ship from the East, conveying sailors and passengers, who had become infected with the disease. The outbreak has now fortunately been brought under control, but the port has been made, under Regulation 23 of the Port Sanitary Regulations (Scotland), 1933, "a district in which small-pox exists in epidemic form," and suffers important restrictions accordingly.

Review

"Ark Royal."—Pp. 63. Price 9d. or 15s. for 24 copies. H.M. Stationery Office, York House, Kingsway, London, W.C.2.

It is a proud, though melancholy, duty to pay homage to the glorious memory of the great *Ark Royal*, the all-too-short record of of which is the entrancing subject of an attractively illustrated brochure, issued on behalf of the Admiralty by the Ministry of Information. Scarcely any battleship of the British Navy, if we except Nelson's flagship *Victory*, has won such a halo of romance and admiration as this renowned craft, which, after three years of spirited and valuable service, fell a victim to a German torpedo on November 13th, 1941, and sank within sight of Gibraltar and safety.

The brochure is divided into ten sectional articles, each detailing some important feature of the vessel's activities, forming a record of its triumphs which will endure for years to come. Commencing with a section, headed sarcastically with the parrot cry, which for more than two years rose from Nazi lips: "Where is the Ark Royal?" and so betrayed the insincerity of their belief that she had been sunk in the early days of the war—a mythical achievement for which a German air pilot was awarded an unearned decoration—the story is told of the building of the vessel in 1939 on Merseyside at a cost of £2,330,000; and, then, of how the *Ark Royal* went to war, hunted the *Graf Spee*, was at grips with the Luftwaffe in Norwegian waters, took part in the melancholy action at Oran when vessels of the French fleet were disabled to prevent their use by the enemy; fought off convoy attacks by the Italian Regia Aeronautica; was in at the death of the *Bismarck* and finally returned to the Mediterranean for the closing duties of her career. She went down shortly after 6 a.m. on November 14th, 1941, fourteen hours after she had been torpedoed, happily with the loss of only a single man out of her company of 1,541.

It is an engrossing story, well told, and sure to be of commanding interest to all who read it. The illustrations, too, are well selected and commendably vivid.

Publications Received

The American Association of Port Authorities has issued a very handy little **Directory of Port Authorities and Port Terminal Operators in North America.** It has been compiled by Mr. Tiley S. McChesney, the Secretary-Treasurer of the Association and contains the names and addresses of boards of harbour commissioners and their leading officials, as also of those independent organisations which are engaged in port terminal operations. All three countries in the North American Continent are included, though in the case of Mexico, the information is confined to a list of "Capitanes de Puerto," in the service of the Direccion General de Marina Mercante, there being no bodies in that country corresponding to the local autonomous corporations in the United States and Canada. The Directory is published and issued from the office of the Secretary of the Association at 2,223 Short Street, New Orleans, Louisiana, U.S.A.

Sand-Lime Bricks.

The Building Research Station of the Department of Scientific and Industrial Research has just issued War-time Building Bulletin No. 20 on "Sand-Lime Bricks" (H.M. Stationery Office, price 3d.), which provides, in a concise form, up-to-date information on the properties and uses of sand-lime bricks, including points of direct war-time interest such as fire resistance, and resistance to blast and earth shock effects and splinter penetration. It is noted that the quality of sand-lime bricks is defined by the newly-revised British Standard Specification for Sand-Lime Bricks (No. 187—1942).

New Dry Docks Company Chairman.

Mr. William Leon, vice-chairman of the Mountstuart Dry Docks, Ltd., has been elected chairman of the Company in succession to the late Lord Glanely, who was killed recently in an air raid on a West Coast town. Mr. Leon is also chairman of the Bristol Channel Dry Dock Owners' and Shiprepairers' Federation and of other companies. He has been succeeded in the vice-chair by Sir Willie Reardon-Smith.

Rapid Ore-handling at South American Port

The following particulars relating to the operation of an ore-handling installation at the Port of Cruz Grande in Chile and the expeditious loading of the *Svealand*, a Swedish vessel in the service of the Bethlehem Chile Iron Mines Company, are extracted from a recent issue of *Lloyd's List*:—

The iron ore at Cruz Grande is obtained from open workings on a mountain about 2,600-ft. above sea level, and at a distance of 6 miles from the port. The mountain is a mass of iron, containing 65 per cent. workable material. Blasting is done by driving tunnels and galleries into the mountain and filling them with gunpowder, which breaks up the rock better than high explosives would do. The blasted rock is loaded into cars by means of grabs of 15 tons' capacity each and transported to a mill where it is broken into pieces of about 2-ft. screen.

The harbour has been excavated to a depth of 40-ft. by blowing up solid rock. Bins of 30,000 tons storage capacity have been constructed into which the 800 tons of ore from each train from the mountains can be discharged in 4 minutes. There are 16 spouts through which the bins are emptied into the ship, and they are suspended from as many separate steel bands. The spouts can be lowered and hoisted quickly by electric winches, the sliding bottoms of the bins being moved by hydraulic power.

In taking her first cargo the *Svealand* was berthed at the spouts at 8.30 a.m., and by 10.45 a.m. she had taken her full cargo of over 20,000 tons of ore. She sailed at 12.15 p.m. on the same day. The net loading time, i.e., not counting the time necessary to move the ship under the spouts, was only 49 minutes. In order to ensure this speed the winches on the deck of this ship are automatic, as is the case with ships on the Great Lakes.

Cargo-handling Performances at the Port of London.

The following recent instances of the rapid handling of cargoes are extracted from the P.L.A. Monthly for July. The discharge of a cargo of 7,700 tons of iron ore commenced at 1 a.m. on a certain day was completed by 10 a.m. the following day, i.e., 33 hours continuous working. The vessel sailed again immediately. A cargo of over 7,000 tons of wheat and canned apples was turned out in two days. In another instance, over 108,000 bags (8,500 tons) of sugar were discharged in four days. A cargo of over 9,000 tons of grain was worked out of another ship in two days, except for an odd 150 tons finished on the third day. On another occasion, a cargo of 5,640 tons of grain was finished in a day—the vessel being in port a matter of little more than 24 hours. Probably the best single day's work was 6,403 tons of grain discharged in 10 hours, i.e., 640.3 tons per hour.

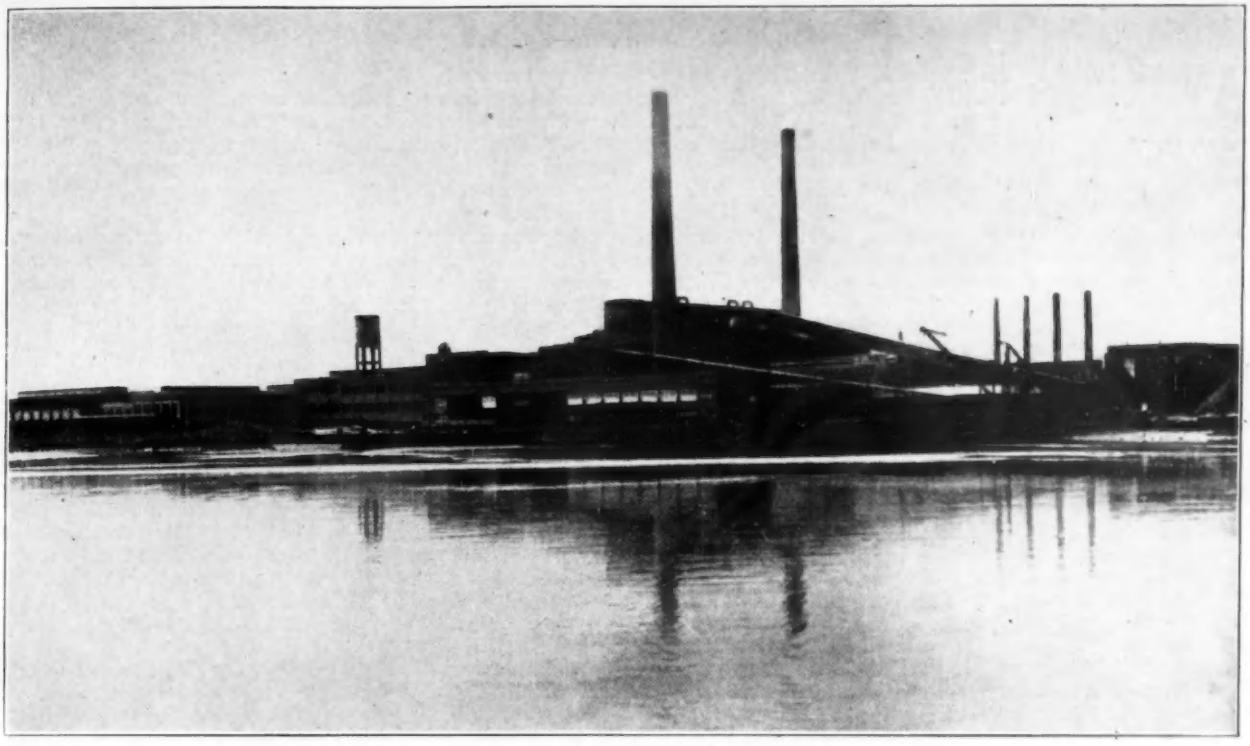
Dock Labour Scheme Appointments.

The constitution of the recently formed East Coast of Scotland Dock Labour Board is as follows: Chairman, Mr. E. W. Burness; members, Messrs. J. R. Leith, T. B. Meikle, J. Pace, F. B. Smith, and H. C. Somerville, with one vacancy. The area manager is Mr. R. B. Peddie with Mr. J. P. Thom (Aberdeen), Mr. A. Burnett (Dundee), Mr. J. Anderson (Grangemouth and Bo'ness) and Mr. A. Boath (Leith) as sub-manager.

Of the Barrow-in-Furness Board, Mr. J. D. White is chairman and Messrs. J. M. Cusack, W. J. Palmer, D. Turton, O. S. West, and D. Young are members. The acting-manager is Mr. G. T. Watts.

Obituary.

On July 22nd, the death, at the age of 63, took place at Shoreham-by-Sea of **Mr. Ebenezer Thomas Ward, C.B.E.,** who was for many years associated with the European Commission of the Danube, first as an Assistant Engineer from 1908 to 1919, and subsequently successively as Resident and Chief Engineer from 1919 to 1935. With headquarters at Sulina, in Roumania, he was instrumental in carrying out a number of important improvement works at the Sulina Mouth of the Danube, which have been described in past issues of this Journal. Prior to his appointment with the European Commission, he was an assistant in the office of the Engineer to the London and India Docks Company before its absorption in the Port of London Authority in 1909. Latterly, Mr. Ward had been living in retirement. Up to the time of his resignation in 1935, he was a Member of the Institution of Civil Engineers.



View of Union Bag and Paper Corporation's Premises located on Savannah River.

*The Port of Savannah**

Leading Port of the State of Georgia, U.S.A.

(Concluded from page 80)

Hoisting Facilities

Shipside hoisting facilities at Savannah consist mainly of locomotive cranes. The marine repair plants of the Savannah Machine and Foundry Co. and Rourke's Iron Works each have one 10-ton steam-operated crane in connection with their marine railways, the former having a reach of 50-ft. and the latter 42-ft. Both are available to the public. The Atlantic Creosoting Co. has three 15-ton steam-operated locomotive cranes, one with a reach of 50-ft. and two with reaches of 48-ft. These are privately operated for handling logs and piles at the company's plant. Another steam locomotive crane of 10-ton capacity and 45-ft. reach is operated by the Savannah River Lumber Corporation. A movable electrically operated derrick is privately owned and operated for handling pulpwood by the Union Bag and Paper Corporation. This derrick is of 5-ton capacity with a 75-ft. reach.

Floating derricks and cranes, all operated by steam, are available to the public and are operated in the harbour for loading and discharging vessels, coal bunkering, and marine construction and salvaging operations. J. W. Fitzgerald operates a barge having a cargo capacity of 150 tons and equipped with a stiff-leg derrick lifting 10 tons. The boom is 55-ft. in length with reach of 40-ft. over the side. The Strachan Shipping Co. has two whirley cranes of 20-ton capacity each, mounted on barges and equipped with electric lifting magnets supplied with current from portable shore generating sets. These are used principally for loading scrap iron, although buckets can be used in place of magnets for other operations. Each has a boom 85-ft. in length with reach of 60-ft. over the sides of the barges. A 6-ton derrick on a lighter is operated by the Atlantic and Gulf Shipping Co. The reach over side of the lighter is 35-ft. and the length of the boom is 70-ft. Rourke's Iron Works has a lighter equipped with 30-ton derrick for wrecking and repair work. The 75-ft. boom allows a reach of 40-ft. over the side.

*Extracted and Abridged from Port Series No. 10, prepared and published, 1940, by the War Department, United States Army and the United States Maritime Commission.

Grain Elevators

There are no facilities at Savannah for loading grain in bulk. Cereals for export from the port are bagged and handled as package freight.

Storage Warehouses

Savannah is well equipped with facilities which are available to the public for storing cotton, cotton products, fertilizer materials, and naval stores and are ample for the present needs of the port. The Seaboard Air Line Railway, the Atlantic Coast Line Railroad, and the Central of Georgia Railway all maintain warehouses for these commodities and also lease certain of their warehouses to private companies in the warehousing business. There are but few warehouses available for shipside delivery and these are practically all for fertilizer storage.

The American Warehouse and Storage Co. leases a number of warehouses and storage sheds at the Hutchinson Island terminal of the Seaboard Air Line Railway for the storage of bulk and bagged fertilizer and general cargo. At the Atlantic Coast Line Railroad terminal, the South-eastern Compress and Warehouse Co. leases a warehouse with wharfage facilities, in which is installed a cotton compress. The Kainit Warehouse at the east end

Port of Savannah—continued

of the terminal is leased by the Savannah Warehouse and Forwarding Co. for the storage of fertilizer materials. Several other buildings are leased as a whole or in part for storage of naval stores and bagging by companies engaged in handling these commodities.

The Central of Georgia Railway leases Warehouse No. 1 to the Savannah Bonded Warehouse and Transfer Co. for handling general merchandise. It is operated under the regulations and tariffs of the Southern Warehousemen's Association. A small section of this warehouse is sub-let to the United States Customs Service for the storage of bonded goods. Warehouses 2, 3, 4 and 5 are operated by the railway for the storage of bagging, automobiles, groceries, and general merchandise, while Warehouses Nos. 9, 10 and 15 are used for the storage of bulk and bagged fertilizer.

The South-eastern Compress and Warehouse Co. has extensive cotton storage facilities at its main plant, which is located 1.6 miles above the Seaboard Air Line Railway bridge. Besides the upper and lower transit sheds, referred to in the table on piers, wharves, and docks, there are 50 units 90-ft. by 90-ft., 50 units 70-ft. by 90-ft., and 19 units 100-ft. by 90-ft., all of concrete and brick construction and equipped with sprinkler systems. The total capacity of the plant is 400,000 bales.

Another cotton warehouse, comprising three units with a capacity of 2,000 bales and located near the corner of Water and Bay Streets, is owned by the South-eastern Compress and Warehouse Co. It is operated by Joseph Tillman, of Statesboro, Georgia, under the name of Tillman's U.S. Bonded Cotton Warehouse.

Rozier's Storage Warehouse and Drayage Co. operates a 3-storey warehouse at River and Williamson Streets for the storage of food products received and shipped by rail and water, including large quantities of cocoanut products from the Philippines.

There are numerous other buildings in the city which could be obtained for storage purposes should occasion demand, but the facilities of the railroad terminals are sufficient to meet the present needs and afford the most convenient means of transfer between water or rail to storage, and vice versa.

Bulk Freight Storage

Large areas, suitable for the storage of commodities not requiring warehouse protection, are available at the principal terminals. At the Atlantic Coast Line terminal 65 acres of open area are available for rosin in barrels in addition to covered areas of 66,000 sq. ft. for rosin and 103,048 sq. ft. for barreled spirits. Covered cotton sheds have a total of 125,270 sq. ft. of storage space. These figures do not include the areas of transit sheds used for similar purposes which are shown under piers, wharves and docks.

In addition to the transit sheds at the Seaboard Air Line terminal, covered areas for cotton and bagged goods total 73,070 sq. ft. and for fertilizer, 50,625 sq. ft. Piers 1 and 2 and part of Pier 3 are open areas available for bulk freight.

The Turpentine and Rosin Factors, Inc., have three open areas totalling 21 acres for rosin storage and four steel tanks of 5,000 barrels capacity each for turpentine.

The National Gypsum Co. has an open storage area of approximately 66,000 sq. ft. for gypsum rock and the Union Bag and Paper Corporation has a covered area of 16,800 sq. ft. for paper-making chemicals.

Dry Docks and Marine Railways

There are no dry docks at Savannah

The marine railway at Rourke's Iron Works on the South side of the river, East of the foot of East Broad Street, has an overall length of 250-ft., and a cradle with a bottom length of 120-ft. The cradle is 35-ft. wide and its mean high-water depths are 7-ft. on forward keel blocks and 10-ft. on aft keel blocks. This railway is equipped to haul out vessels up to 600 tons. A locomotive crane is available for use at the railway.

The Savannah Machine and Foundry Co., located on the South Bank of the river, at the foot of Randolph Street, operates a marine railway with an overall length of 375-ft. having a cradle 225-ft. long and 45-ft. wide. The depth of water on the keel blocks at mean high water is 7-ft. forward and 13-ft. aft. The railway, built in 1910, has a lifting power of 1,000 tons and is served by a 10-ton locomotive crane.

The Savannah Lighterage and Transfer Co., located on Hutchinson Island, opposite foot of West Broad Street, has a railway with an overall length of 250-ft. and a cradle 100-ft. long and 30-ft. wide. There is a depth at mean high water of 8-ft. on the forward keel blocks and 15-ft. on the aft keel blocks. This railway, capable of lifting 600 tons, is operated privately for owners' equipment.

The Union Bag and Paper Corporation maintains a private marine railway adjacent to its wharf for the repair and maintenance of its barges. It was built in 1938, has a cradle 32-ft. by 68-ft., and is capable of handling a barge 30-ft. by 100-ft. The lifting power applied to the cradle is 250 tons.

Marine Repair Plants

There are three plants at Savannah which are engaged principally in making repairs to vessels.

Rourke's Iron Works, located on the south bank of the river, east of the foot of East Broad Street, is equipped to repair wood and steel vessels, hulls, engines, boilers, and dynamos. Shops in connection with the plant consist of an iron foundry 75-ft. by 75-ft., a brass foundry 35-ft. by 35-ft., a machine shop 70-ft. by 75-ft., blacksmith and boiler shops 60-ft. by 98-ft., and pattern and welding shops 60 by 90-ft. Castings of iron up to 5 tons in weight and of brass up to half ton can be produced. An ample stock of material and fittings is maintained for all ordinary requirements.

The Savannah Machine and Foundry Co. has machine, blacksmith and boiler shops, each 55 by 100-ft., a pattern and storage roof 60 by 149-ft., and a brass and iron foundry 60 by 70-ft., located at 632 Indian Street. The plant is also equipped for electric, acetylene, or thermit welding, having 1 portable 300-ft. compressor, 1 portable 150-ft. compressor, 2 portable gas-driven electric welders, 1 stationary electrically driven electric welder, one 84-in. boring mill, and 1 portable 20-ton lift for dismantling turbines and large power plants in vessels. Shafts 48-in. in diameter by 24-ft. in length can be produced and iron castings of 4 tons and brass castings of 2 tons. A stock of material with a value of approximately $15,000 is maintained. The same company operates a woodworking and paint shop, 40 by 60-ft., in conjunction with its marine railway located on Bay Street at the foot of Randolph Street (see marine railways).

Floating Equipment

There are 11 tow boats, 2 derrick lighters, and 16 open-deck lighters at the Port of Savannah. There are also 25 barges, which include 2 oil barges, 1 water barge, 1 derrick barge, 19 open barges and 2 floating cranes.

Wrecking and Salvage Facilities

The four tow boats of the Atlantic Towing Co are equipped with steam capstans and with fire and wrecking pumps. The water barge of this company is also fitted with pumps which can be used in wrecking and salvaging operations. The tow boats operated by the Savannah Lighterage and Transfer Co. can be obtained for wrecking purposes when necessary.

Rourke's Iron Works operates a derrick lighter for wrecking and repair work and the raising of sunken vessels. It is equipped with a 75-ft. derrick and also carries pumps, diving gear, and full salvage equipment.

Railroads

Port of Savannah, Georgia, is served by the following common carriers by railroad; Southern Railway System, Seaboard Air Line Railway, Atlantic Coast Line Railroad, Central of Georgia Railway, and the Savannah and Atlanta Railway.

The Southern Railway System consists of a network of lines in the States east of the Mississippi and south of the Ohio and Potomac Rivers. Its lines reach all of the major South Atlantic ports except Fernandina, Florida, and Wilmington, N.C., as well as most of the important interior points in Southern classification territory. Two main lines are operated between Washington, D.C., and New Orleans, Louisiana, one via Knoxville and Chattanooga, Tennessee, and Meridian, Mississippi, over its own rails, and the other via Atlanta, Georgia, in connection with the Louisville and Nashville Railroad. Its lines extend also to Memphis,

Port of Savannah—continued

St. Louis, Cincinnati, and Louisville, and to Mobile on the Gulf. This system, in connection with the Southern Pacific lines at New Orleans, forms one of the important transcontinental routes. A total of about 8,000 miles of track is operated. At Savannah the Southern Railway uses freight terminals jointly with the Central of Georgia Railway.

The Seaboard Air Line Railway operates from Norfolk and Richmond, Vancouver, Southward to Miami on the East Coast, and Tampa, Boca Grande, and St. Petersburg on the West Coast of Florida. Its lines reach all of the major South Atlantic ports, as well as many of the important interior points in South-eastern territory. At Birmingham and Montgomery, Alabama, and Atlanta, Georgia, connection is made for points in the South and South-west. A total of about 4,000 miles of track is operated.

View showing Unloading Equipment at Wharf of National Gypsum Co.

The Atlantic Coast Line Railroad operates about 5,000 miles of track in the same general territory as the Seaboard Air Line Railway, above described, serving most of the common points in South-eastern territory. Its lines extend to all major South Atlantic ports except Fernandina, Florida, and to many of the important interior points, as well as to all important ports on the West Coast of Florida. At Montgomery, Alabama, connection is made for points in the South and South-west. Both the Atlantic Coast Line and the Seaboard Air Line Railways maintain through service between New York and the Florida resorts via Richmond and Washington.

The Central of Georgia Railway operates between Savannah and Atlanta, Macon, Columbus, Athens, and Augusta, Georgia, Chattanooga, Tennessee, and Montgomery and Birmingham, Alabama, connecting with all diverging lines at those gateways. A total of nearly 2,000 miles of track is operated, and largely in the State of Georgia.

The Savannah and Atlanta Railway operates between Savannah and Camak, Georgia, a distance of 145 miles. At the Port of Savannah connection is made with all railroads and steamship lines, and at Camak with the Georgia Railroad. A branch line also extends to Port Wentworth.

Facilities for Interchange Between Rail and Water

The Atlantic Coast Line Railroad, the Central of Georgia, and the Seaboard Air Line railways reach their own water terminals at Savannah direct, and jointly serve all of the developed water front of the port. All of the principal warehouses and industrial plants have direct rail connections.

The Savannah and Atlanta Railway, which owns no developed water front property, serves directly five industries located on the Savannah River above the Seaboard Air Line Railway bridge and also connects with the various trunk lines entering the city. The Southern Railway does not operate terminals at Savannah, the traffic of the port by this carrier being handled by the Central of Georgia Railway.

The terminals of the Ocean Steamship Co. and the merchants and Miners Transportation Co., are served by the Central of Georgia Railway. The Beaufort-Savannah Line operates a leased wharf at the foot of Lincoln Street in the rear of the marginal tracks of the Central of Georgia Railway, on the River Street.

COMMERCE

The trend of water-borne commerce at the Port of Savannah was generally upward during the 10-year period 1929-38. The volume of cargo tonnage at the beginning of the decade was 2,476,110 tons as compared with 3,448,134 tons in 1938, an advance of 972,024 tons or 39.3 per cent. The average annual movement was 2,752,201 tons, of which 29.4 per cent. was in foreign traffic, 61.2 in coastwise traffic, 4.1 per cent. in internal traffic, and 5.3 per cent. in local traffic.

The traffic of the port was mainly in-bound, the receipts having been twice the volume of the shipments. This preponderance of in-bound movement was most pronounced in the coastwise traffic, in which the receipts were 43.2 per cent. of the total commerce of the port, as compared with 18 per cent. for shipments.

Imports

Imports declined during the first half of the 10-year period but recovered in the latter half. The low point was reached in 1922 and was occasioned mainly by reductions in the receipts of nitrate of soda, petroleum products, and raw sugar. The average annual movement amounted to 468,673 tons, the principal commodities having been fertilizer materials, which accounted for 39.6 per cent.; raw sugar, which was 27.2 per cent.; and petroleum products 19.3 per cent.

Exports

The amount of export traffic did not deviate very much from the annual average movement during the 10-year period except in 1937, when increased shipments of iron and steel scrap and iron and steel manufactures caused a peak export movement of 443,750 tons. The average tonnage shipped to foreign ports was 342,664 tons. The principal commodities in this movement were naval stores, cotton, and iron and steel scrap, which together represented 62.9 per cent. of the exports.

Coastwise Receipts

In point of tonnage coastwise receipts constituted the most important class of traffic at the port during the 10-year period, the movement increasing practically every year throughout that time. The annual average was 1,190,403 tons, or 43.2 per cent. of the average traffic of the port. By far the principal commodities included in this traffic were petroleum products, which comprised 68.7 per cent. of the total. Other commodities of importance were raw sugar, representing 3.6 per cent.; fruit and vegetables, 2.8 per cent.; and paper and paper manufactures, 2.1 per cent.

Coastwise Shipments

Shipments out of the port in coastwise trade pursued a generally upward trend during the decade and ranked second in volume

Port of Savannah—continued

among the several classes of traffic, being exceeded only by the coastwise receipts. The average annual shipments amounted to 494,098 tons, the principal commodities being lumber and timber which accounted for 16.4 per cent. of the whole; coal, which represented 13 per cent.; naval stores, 8.8 per cent.; cotton goods, 7.6 per cent.; and cross ties, 5.6 per cent. The movement of lumber and timber fluctuated during the first half of the decade, reaching a height of 119,938 tons in 1935, from which it declined to 73,163 tons in 1938. The movement of coal was entirely in ships' bunkers.

Internal Receipts

Although the average annual amount of commerce in this traffic was only 82,271 tons, internal receipts during the first year of the period were almost twice as great and in the last year 2½ times as great as the average tonnage. The total in 1929 was 157,077 tons but, due to decreased movements of logs and oyster shell, in the following year the receipts dropped to 80,357 tons. The low point occurred in 1935 when 24,387 tons were handled. In 1937, due to a marged increase in the receipts of logs and pulp wood, the traffic increased to 131,784 tons and an increase of more than 60 per cent. in the following and last year of the decade, mainly because of increases in the receipts of pulpwood and sugar, accounted for a volume of 214,290 tons.

Internal Shipments

The amount of commerce involved in shipments from Savannah to interior points was smaller than that of any of the several other classes of traffic. The average annual movement during the period was 29,496 tons, the principal commodities being petroleum products, sugar, and groceries, amounting to 80 per cent. of the whole. The lowest tonnage of the decade was 10,160 tons handled in 1929, while the peak covered in 1938 when 50,219 tons were handled.

Local Traffic

Lighterage movements within the harbour make up the bulk of local traffic at Savannah. The principal commodities handled locally are petroleum products (mainly fuel oil), cotton and naval stores. The movement of fuel oil was fairly constant throughout most of the 10-year period under discussion, but the movements of cotton and naval stores declined annually. The volume moved during the first two years of the period was comparatively small, averaging 30,132 tons. The peak year was 1931 when 245,964 tons of traffic were received from or shipped to points within the harbour. The average annual volume of local traffic was 144,596 tons.

Merseyside Dock Labour

Alleged Malpractices

Under the heading of **" Work Dodged by Dockers: Grave Allegations at Liverpool,"** a serious indictment of the dock labour control at the Port of Liverpool, appeared in an article by a Special Correspondent in *The Times* of August 14th, the information being stated to have been supplied by " a man who bases his allegations on observations made during 12 months' work at the docks as a supervisor."

The following day, appeared a spirited reply from the Regional Port Director (Mr. J. Gibson Jarvie) in the form of a lengthy and detailed statement, dealing with the charges *seriatim* and characterising them as " mischievous in that they contain just that small element of fact from which can be produced a scandalous story which is very nearly 100 per cent. untrue."

The charges are varied and numerous, and it must suffice to indicate their nature from the main points of Mr. Jarvie's statement, which is reproduced here as being of outstanding interesting to port workers and labour superintendents.

" It is not true," states Mr. Jarvie, " that dockers claim the right to leave their work without permission. This privilege is still restricted to refrigerator ships, where conditions demand that men working in the cold chambers must have a spell in a warmer temperature after each hour's work below. This practice—' spelling ' or ' welting '—has not spread to other classes of cargo, nor is it practised by dock hands and porters on the quay. It is true that, in some ships, men will attempt ' spelling,' but these cases are relatively few; it is against orders and only happens where the foreman or employer is too weak to exercise proper discipline over the men.

" While the dockers' accuser more or less accurately describes the hours and wages paid to the men, the statements with regard to equipment and practice are either untrue and misleading or not up to date. For example, some employers are criticised because they are not equipped with sufficient electric bogies. It is quite true, but it does not explain that equipment has been lost in Merseyside through enemy action, and in many cases it has been impossible as yet to replace it. It is true that employers on Merseyside readily lend their equipment to each other, but it is untrue to say that the ' cost-plus system of payment is a consideration here,' since the cost-plus system no longer exists in Liverpool.

" Weighing cargo, ex-ship has also been practically abolished; cargoes are weighed ex-ship only under exceptional circumstances and under the assurance that quay clearance and turn-round of the ship will not be impeded.

" To suggest also that ' loading tonnages are so low that for the first time in the history of the port, there has been introduced a piece rate for loading, again on a generous basis,' is sheer nonsense. Loading piece rates have been introduced for precisely the same reason that discharging piece rates have been introduced —to give the worker an inducement to put more energy into the job in order to obtain better results.

" It is true that there is ' no night administration ' belonging to port labour authorities on the docks, for the simple reason that their primary function of manning ships is not carried out during these hours. When men are allocated for night work, they are in charge of the various foremen, whose duty it is to see that they start on time, that they work and that they leave on time.

" It is quite untrue to suggest that ' men work for two or three nights, earn the guaranteed minimum of £4 2s. 6d., and fail to attend the rest of the week,' or that ' although they break the guaranteed minimum of 11 turns a week, they seem to escape without a penalty.' There is a certain amount of absenteeism, but much of it is attributable to elderly, or physically unfit men, who are incapable of putting in 11 full turns in a week. But perhaps the best answer to these statements are the figures recently published from my office as the result of the Honour Week." (Readers will find these figures on page 93 of the August issue):

" With regard to the criticism of the Merseyside Docks and Harbour Board, it is probably true that improvements in the dock system could be made. The port was laid out many years ago and doubtless there are certain geographical limitations. But, in spite of all the disadvantages of working under war conditions, with losses occasioned by enemy action, with the average age of the dockers having risen to the high figure of 47 to 48, with fully-loaded ships coming in (many of them with heavy lifts) as against pre-war loading, with many different types of cargo, with the disadvantage of ships coming in ' bunched,' instead of being equally spread over the year on a regular schedule, the work of the port goes on, and during these war months the rate of loading and discharging compares favourably even with pre-war days.

" It is true, I have no doubt, that there are some young men on the docks who are dodging war service. That would be equally true of every large undertaking. It is also true that there is an element on the docks who are of no value whatever to the national effort, but that element is a relatively small percentage, and even that is being reduced as men are weeded out."

In conclusion, Mr. Jarvie intimated that Mr. Fred Smith, district secretary of the Transport and General Workers' Union, had had seen the foregoing statement, agreed with it and wished to be associated with it.

The matter, however, was not allowed to rest with this disclaimer, for on August 19th, *The Times* correspondence column contained a letter signed **" Three Supervisors "** supporting the allegations made in the article of the 14th. The relevant portion of this communication was as follows:—

Merseyside Dock Labour—continued

"1. The allegations contain a 'major element of fact' and not a 'small element of fact.' 2. 'Spelling' is general throughout the port on non-refrigerator ships and is caused by original lack of discipline at the control points where the inspectors have had practically all the punitive rights taken away from them. 3. The 'cost-plus' system was stopped on April 6th, and weighing of cargo, though not now general, does still go on. 4. The loading piece rates are generous, but the main thing that is wanted is a certain amount of 'war effort' spirit on the part of at least 60 per cent. of the men. 5. The statement about men away on night work from 8 p.m. to 10.30 p.m. or after is perfectly true. 6. We do not think that the work on the docks has improved one bit since the advent of the new scheme, in spite of the incentive of piece work and less weighing; in fact, we would say that conditions at the present time are deteriorating.

"We would go further than your article and would suggest asking Mr. Jarvie's own stevedoring and labour inspectors what they think of present conditions, and in particular of 'honour weeks.' Their answer would be very forthright, as in fact we believe it has been to Mr. Jarvie himself.

"We should doubt that any berth in the port is doing as much as two-thirds of their pre-war tonnage rates, and a number are doing much less—again in spite of the extra incentives, such as (1) piece work to the men, (2) reduction of weighing, (3) better delivery from the quay, (4) easier cargoes."

Further support of the criticisms is to be found in a letter from a reader of *The Journal of Commerce and Shipping Telegraph*, which which was published in that Journal on August 20th. This letter ran as follows:—

"Unquestionably there are many honest genuine dockers; to them we owe our respect and gratitude. But there are others, and in spite of denials and attempts to whitewash them, the bald facts stand out and are only too obvious to anyone who has business on the docks.

"Work dodging has been developed to a fine art, and it is no uncommon sight to see six men doing a task which could quite reasonably be executed by two. Most of the dodging methods employed have already been disclosed and do not require repeating, but before mentioning another prevalent evil, reference may be made to one spot.

"On the west side of a particular dock, adjacent to the river wall, some air raid shelters are situated. These form an effective screen, and the outside walls excellent supports for tired heads and backs. These walls are obviously the 'popular side,' as I have yet to see them deserted on a fine day.

"Habitues of this site who, it may perhaps be charitably suggested, are temporarily obsessed with the 'Holidays at Home' feeling, have even been observed to receive the ministrations of the serving maid from the near-by canteen, which could provide accommodation but not the essential seclusion.

"There is little furtiveness about the termination of labours for the day. The exodus from the docks begins with a trickle a few minutes after 4 p.m.; at 4.30 the trickle has developed into a torrent. Even some of the women, probably imbued with the spirit of 'equal rights,' have contracted this disease of leaving before their time, and mingle with the men in their hurried homeward trek. If a portion of the acceleration they display in leaving the work area was applied by them to their jobs, what a difference it would make!

"By stopping before the allotted time these offenders, in addition to torpedoing the war effort, are getting paid for work not done, and are consequently defrauding the nation; could not a few salutary lessons be administered through the police courts?"

River Wear Commission.

To fill a vacancy among the representatives of the First Mortgage Debenture stockholders, Alderman Frank Nicholson, chairman of the River Wear Commission, temporarily vacated office pending re-election to succeed Mr. J. E. Dawson, the late chairman. Following his resignation as a Corporation representative and his re-election as a stockholders' representative, Alderman Nicholson was formally re-appointed chairman.

Notable Port Personalities

XXVI—The Hon. Frank C. Ferguson

For almost seventeen years a Commissioner of the Port of New York Authority and for the last eight years Chairman of the Board, the **Hon. Frank C. Ferguson** entered on a new term of office for six years on July 2nd, 1942. He was reappointed by Governor Charles Edison as a Commissioner from the State of New Jersey, and his nomination was promptly confirmed by the State Senate.

The re-appointment of Mr. Ferguson met with general approval and was in recognition of his long and effective leadership in the councils of the Port Authority. His period of service extends well

The Hon. FRANK C. FERGUSON.

beyond that of anyone who has been a Port Authority Commissioner from either of the two States, New York and New Jersey, constituting the port area. He started as a member of the Board in the pre-financing, pre-construction days of the organisation and so was intimately familiar with the background and growth of the Port Authority into a public agency of wide prestige and of high standing.

Mr. Ferguson was appointed a commissioner originally in November, 1925, by Governor George S. Silzer. He was reappointed by Governor Morgan F. Larson, in 1930, at the time of the merger with the Holland Tunnel. He was again renamed six years later by Governor Harold G. Hoffman.

Mr. Ferguson was Vice-Chairman of the Port Authority from 1928 to 1934, when he succeeded the late General George R. Dyer as chairman. He has been chosen annually ever since by acclamation and upon the insistence of his colleagues.

The Chairman is prominent in financial fields and has taken a particularly active part in the remarkably successful financing of Port Authority undertakings. His principal business interest is the presidency of the Hudson County National Bank, of Jersey City. He resides in East Orange, N.J., of which he is a native.

From an American point of view it is interesting to note and is significant of the business-like and non-partisan character of Mr. Ferguson's career as a Commissioner that two of his appointments have come from Democratic Governors and two from Republican Governors.

Destruction of Timber by Marine Organisms in the Port of Sydney

*Excerpts from Supplementary Report No. 2**

By Messrs. R. A. JOHNSON and F. A. McNEILL.

(Continued from page 84)

" Chelura " and " Limnoria "; Experimental Aquarium Observations

One of the outstanding observations to date concerns the activities of the crustacean *Chelura*, so commonly encountered as the associate of *Limnoria* in the latter's attacks on softwood and infrequently on hardwood. While a previous claim (Suppl. Report, No. 1, 1936), that *Chelura* never occurred on turpentine timber has since been modified, its general scarcity on hardwoods first created a doubt as to its positive activity as a borer and a menace. To establish the fact many separate fragments of infested oregon fir (softwood) timber were from time to time introduced into the horizontal aquarium tank to rest alongside an unattacked oregon timber sample. At all periods during the experiment only a few inches separated the fragments and timber sample under observation.

Detail of attack by " Martesia " in a section of the truewood of one of the turpentine piles which collapsed in Bantry Bay, Middle Harbour, in 1938. In one of the four cleanly cut bore holes is a complete example of " Martesia " (see description in text) with its hinder end close to the outside of the pile near where the fracture occurred.

The experiments were initiated in September, 1937, and closely watched. All the infested fragments of oregon used contained *Chelura* and *Limnoria* in association, the former numerically very much in the ascendancy. Detailed results are as follow:

Upon initiation of the first experiment, a lapse of two days was sufficient for a sparse infestation of *Limnoria* to transfer to the unattacked timber sample, but no *Chelura* had left the accompanying infested timber fragment, notwithstanding that, in their normal course, they occupied a position nearest the surface layers.

Approximately one hundred (100) specimens of *Chelura* were then collected under water from the infested timber fragment and transferred directly to the surface of the slightly *Limnoria*-attacked timber sample. Within a few hours all *Chelura* had returned to the honeycombed exterior workings of the infested fragment from which they had been transferred. The same operation was repeated, after which the infested fragment was removed from the aquarium, leaving *Chelura* outnumbering the sparse *Limnoria* already attacking the new timber sample by approximately ten to one. Following this procedure the tank was left undisturbed for six days. At the end of that time, a few *Limnoria* which had voluntarily transferred operations from the infested fragment to the surface of the new timber sample had each excavated bore holes that all but accommodated their bodies. The introduced specimens of *Chelura*, however, were found to be still crawling about the timber surface, having apparently no desire to join in the initiation of an attack. This last fact provides substantial evidence in establishing the earlier conclusion, arrived at in field operations, that *Chelura* does not initiate an attack.

The next phase of the same experiment took place another seven days later, when further critical examination disclosed that the attacking *Limnoria* had completely embodded their bodies in the timber sample. The *Chelura*, somewhat reduced in numbers, were crawling about the surface as before. On this occasion, fifteen (15) days after the experiment began, another infested timber fragment, similar to the one previously discarded, was introduced and allowed to remain undisturbed for three days. Most of the crawling specimens of *Chelura* took full advantage of this short period to take shelter with the great number of their kind so recently introduced with the new infested timber fragment; only a few remained on the large, slightly *Limnoria*-attacked timber sample. In the meantime the number of *Limnoria* attacking the last-named had increased about threefold, the newcomers just transferred across being in exposed positions on the surface. Those *Limnoria* already well established in the timber sample had accumulated little mounds of excavated wood fibre at the entrances to their bore holes.

A further inspection carried out after a lapse of another four days disclosed that the mounds of wood fibre excavated by *Limnoria* had increased about fourfold; and practically all the attacking *Limnoria* had bored below the surface; on this occasion there were no *Chelura* to be found on the timber sample. At the conclusion of the inspection, the second introduced infested fragment was replaced by a third fresh fragment, again carrying a similar preponderance of *Chelura*.

Another six days later, or 28 days after the experiment began, numerous examples of *Limnoria* were to be found which had bored holes three times their own length in the timber sample. The bore holes were $\frac{1}{32}$ of an inch below the surface, and communicating with them were the normal minute, though visible, breathing holes approximately one body-length apart. Also some tiny juvenile *Limnoria* were discerned, boring into the unbroken surface in the region of the larger occupied bore holes. At this stage twenty-six (26) days had passed since the first introduced examples of *Limnoria* had been observed to have transferred from an infested timber fragment to the unattacked sample of oregon timber. At the same time as the observations on *Limnoria* were proceeding, the important discovery was made of some examples of *Chelura* accommodated in entrances of occupied *Limnoria* bore holes; these obviously had voluntarily transferred across from the third or most recently introduced infested timber fragment. They were, however, not indulging in any boring on their own account, and appeared to be migratory. Over a period of a few hours several were found to have deserted the *Limnoria* bore holes they had previously occupied.

The present critical observations on *Chelura* greatly support previous claims that this borer does not initiate an attack (see Suppl. Report, No. 1, 1936). It now also appears obvious that

Destruction of Timber by Marine Organisms—continued

Chelura is unsettled in its early activity, not only on the unbroken surface of timber, but even where the initial stages of a *Limnoria* attack afford some inducement for it to effect permanent lodgment. Another factor in support of the claim that *Chelura* is not injurious is its characteristic habit of being the first to desert *Cobra*-attacked timber. Details of the habit appear in the Suppl. Report, No. 1, 1936.

Over a subsequent and final period of three weeks in the aquarium experiment, three separate batches of healthy *Chelura*, each totalling about fifty (50), were tediously collected under water and liberated in the tank. This greatly increased number, however, failed to act in any way different from that already recorded. Upon abandonment of the first experiment at this stage, two further complete experiments were carried out along exactly the same lines as the first, but without any new data resulting. The positive results of critical experiments have now borne out a recent conclusion, arrived at after close field observation, that *Chelura* has no standing as a timber boring pest.

It would appear that no experiments involving the behaviour of *Chelura* have previously been initiated. The pest has been

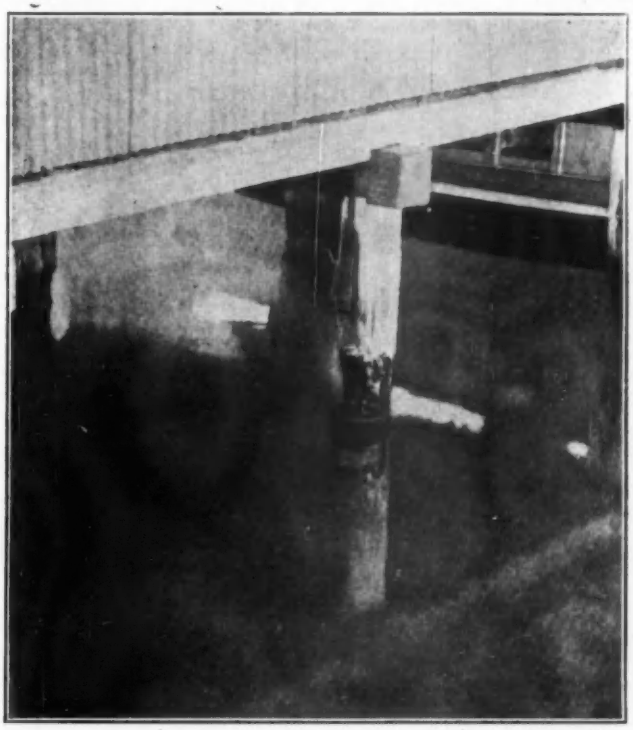
Evidence of destruction by juvenile "Martesia" in portion of a special sample of turpentine timber. At right is shown entrance holes made through the bark. The borers responsible were seven months old. Material from Test Station No. 31A, Bantry Bay, Middle Harbour.

encountered in most investigations in other parts of the world, and it seems that its presence as a positive menace has rarely been questioned. A study of recent publications has elicited two opposed points of view typical of the general observations on this vexed question. Both originate in the United States of America. One conforms to the views expressed as a result of the critical investigations in Port Jackson, and is credited in *Engineering News Record*, Vol. 121, No. 4, New York, July 28th, 1938, to Dr. Chas. Blake, Massachusetts Institute of Technology. Here is the quotation concerned: "Of the marine parasites [pests], in addition to the clam-like *Teredo* and the shrimp-like *Limnoria*, a second small shrimp-like animal, *Chelura terebrans*, is now attracting attention, but Dr. Blake stated that while it occurs in holes in wood, it is not certain that it can attack sound wood."

The observations disagreeing with Dr. Blake's claims and also with the findings in the present report may be found in the "Preliminary Report on the Investigation of Marine Borer Problems in Connecticut State Water Commission in co-operation with the New England Marine Piling Committee," emanating from the William F. Clapp Laboratories (Report No. 884, February 16th, 1938). They represent the majority opinion concerning the state of *Chelura* as an economic menace. Several pages include strong reference to the destructive qualities of *Chelura*. Two typical quotations are as follow: *Chelura terebrans*, a wood-boring crustacean far more destructive than *Limnoria*, appeared in large numbers in the test board," etc. "The three most common species [genera] with which we are concerned at present are the *Teredo*, *Limnoria* and *Chelura*. Of these, the *Chelura* is by far the most destructive. In fact, it has been found in many places that the damage caused by this species [genus] is about three times greater than that caused by either of the other two. Their attack seems to be very severe because it is more continuous."

A Seawater Fungus Causing Deterioration of Hardwoods.

In the course of special experiments carried out to determine the resistance of various timbers to marine borer attacks, it was observed that noticeable softening of the surfaces took place on most of the hardwood samples (including turpentine). The condition had every appearance of being due to the action of a fungus growing in sea water. Verification was sought and a minute



General view of the piling of one of the jetties in Bantry Bay, Middle Harbour, saved from the destructive operations of the bivalve borer "Martesia." The photograph was taken when the tide was low and shows portions of the casings of Sealing Compound, which extend from low water mark to the mud line at a depth of from 12-ft. to 15-ft.

examination enabled the collection of numerous ivory-coloured egg-like spore sacs, measuring up to approximately 2 mm. across.

The specimens were submitted to various specialists, and to the Division of Forest Products, Commonwealth Council for Scientific and Industrial Research. The latter provided the information that the decay in question was apparently caused by the fungus discovered, which was referred to the Class Ascomycete. From enquiries made it would seem that the presence of a fungus in sea water is new in the field of Australian botanical research.

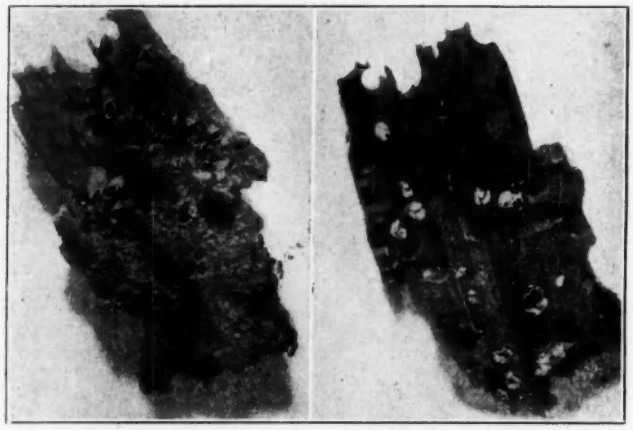
The discovery has prompted an expansion of the experimental work as above. Attempts are being made to measure timber deterioration and certain data have already been accumulated. These show that some timbers are weakened by a softening of the surface fibres to a depth of one-quarter-of-an-inch of truewood in a period of seven years of immersion.

"Martesia"—A New Menace in the Port of Sydney.

Only in the most recent phase of the local marine borer investigations has it become apparent that the timber-boring mollusc *Martesia* is noticeably assuming destructive habits. Examples which have been collected and submitted to Mr. Tom Iredale, of

Destruction of Timber by Marine Organisms—continued

the Australian Museum, have been identified as *Martesia striata* Linnæus. This species is reported as having a wide distribution in the tropical Pacific Ocean. The borer is a bivalve shell fish in some ways comparable to the well-known mussel. As in the case with the related *Cobra* forms, the boring is done with shells. Unlike *Cobra* borers, however, the body of the *Martesia* animal is enclosed within its paired shells instead of being drawn out into a worm-like form. The shells narrow abruptly from the wide, heavy and sculptured boring " head " towards the small oval opening at the hinder extremity. Through the opening is extruded a pair of siphons, one incurrent and the other excurrent. These are shorter than most siphons possessed by *Cobra* borers, but like them they project into the water through the small holes made by the *Martesia* borers when they enter the timber as juveniles. There are no pallets present as in *Cobra* borers. As constant communication has to be maintained with the outside water, the depth of the bore holes is determined by approximately the length of the shells enclosing the *Martesia* animal.



External and internal views of the truewood of turpentine timber infested with "Martesia." Sample taken from a pile which collapsed in Bantry Bay, Middle Harbour.

While for many years isolated local occurrences of *Martesia* have come under notice, no concentrated attack of dangerous dimensions has taken place in wharf structures. The first discovery of serious damage in the Port of Sydney was observed in the turpentine piles carrying a number of jetties in Bantry Bay (Station 31a), Middle Harbour, which were constructed about the year 1912. Several of these piles simultaneously collapsed in 1938 and the subsequent examination unexpectedly showed an establishment of *Martesia* which had not been evident when certain other piles in Bantry Bay had been replaced in 1930, following inter-tidal destruction by *Limnoria* and *Sphaeroma*. In the 1938 collapse *Limnoria* aided *Martesia* by breaking down the partitions of timber between individual *Martesia* borers.

Immediately upon the discovery of the *Martesia* destruction in 1938, a test sample of turpentine was immersed at the locality and a test station established as No. 31A. This sample was triangular-shaped in section and 8-ft. long; i.e., a sector of circular pile. The bark of the outside surface was intact and the sample hung with the lower end at mud level in 10-ft. of water. The date of immersion was August, 1938. A first examination in March, 1939, disclosed a marked attack by *Martesia*, assessed as heavy Infesting borers measured, on an average, three-eighths-of-an-inch in diameter and five-eighths-of-an-inch in length (see illustration). A further examination of the sample in October, 1939, showed considerable advance in the attack, and the size of the borers had increased to five-eighths-of-an-inch in diameter and 1-in. in length. Entry into the turpentine sample had been made indiscriminately and with equal facility through the bark, sapwood and truewood surfaces, a practice which is unusual among destructive boring molluscs. The point of maximum attack was found to be approximately 2-ft. from the mud line, coinciding with the point of fracture on the collapsed piles already mentioned.

At the same time as this examination was made, a squared sample of cypress pine (*Callitris glauca*) was also immersed. In some respects this timber is comparable to turpentine in its resistant qualities.

In May, 1940, the cypress pine sample was examined in conjunction with the turpentine sample, and was found to have registered a *Martesia* attack assessed as being at the very heavy stage; destruction of the turpentine sample had advanced to the 40% stage and the average size of the borers had increased to ¾-in. in diameter and 1½-in. in length. Also at approximately this time three additional *Martesia*-infested piles collapsed under the jetties at the site.

From the foregoing evidence it was plain that the damage caused by *Martesia* had assumed such advanced dimensions at the locality that the collapse of the remaining piles would have occurred within about three years. Accordingly consideration was given to some effective method of preservation and the newly developed Plastic Compound Method was extensively employed for the first time. In all a total of fifty piles, including those being newly replaced, was successfully encased from the mud line to near low water mark, without the aid of a diver. The operation not only ensured the destruction of the marked concentration of *Martesia* at the site, but also militated against the possible spread of larvæ to wider areas.

While the solution of the Bantry Bay problem was considered solved, the remarkable development of *Martesia* at the locality provided a warning which made it imperative to check the possibilities of its being introduced into other parts of the port. With this end in view three turpentine samples similar to the one placed earlier in Bantry Bay were immersed in October, 1939, at (1) Killarney Middle Harbour (Station 31B), and at (2) a selected point (Station 31E) intermediate to Bantry Bay and (3) The Spit (Station 31). All these were examined in May, 1940, at the same time as the Bantry Bay samples of turpentine and cypress. The result was the finding of a very heavy attack at Killarney (upstream from Bantry Bay), but no evidence of attack was seen at the other two station sites.

Concerning the destructive ability of *Martesia* in other parts of the world, it is interesting to note the reaction of Australian turpentine samples at the Panama Canal as recorded in the Seventeenth Report of the Committee on Wood Preservation—American Railway Engineering Association, Chicago, U.S.A., February, 1940. The report claims:

> " The results this year are especially interesting in that the highly resistant timbers [which include turpentine] show no marked changes since last year. *Teredo* is not important, and in only a few cases the gribble (*Limnoria lignorum* Rathke) could be considered very active. In no case was the gribble as destructive as in other regions.
>
> " The really destructive forms were the two pholad molluscs *Martesia striata* Linné and *Hiata infelix* Zetek and MacLean. In some cases these were very abundant."

An earlier U.S. America publication, " Marine Piling Investigations—National Research Council," by Atwood and Johnson, 1924, states:

> " The rate of destruction by *Martesia* is not so rapid as that by some of the ship worms under favourable conditions, though from pile specimens received from Snead's Island, Tampa Bay, and from the test blocks from Cavite, Philippine Islands, it appears possible that in these locations a pile might be destroyed in less than two years."

(To be continued)

Dredging of Canadian Harbour.

A contract has been let by the Canadian Department of Public Works for the dredging of the harbour at Port Dover, a fishery harbour in Ontario on the North shore of Lake Erie, between Port Rowan and Port Colborne. The harbour was previously dredged in 1936. The controlling depth at low lake level in the entrance channel is 12-ft.

The Ownership of Tidal Lands in the United States

*Report of Special Committee on Submerged and Reclaimed Land Legislation**

To the **American Association of Port Authorities**

Gentlemen,—

Elsewhere in this report reference is made to certain exhibits† herewith appended for the record to which we urge your earnest consideration. All too few of our membership fully appreciate the serious aspects of the legislation which concerns the submerged and reclaimed land question; all too few comprehend the grave consequences involved in such legislation. It is our hope this report will be carefully studied and that the membership will recognise the importance of being fully informed upon this subject.

Man does not spend capital until he has first made certain of his title. Capital invested in American port development now exceeds two billion dollars. All such development has been predicated upon the certainty of title.

Since the beginning of this republic, title to the submerged and tide lands and consequently to reclaimed lands, areas involving all port development in America, have rested in the respective States and not in the Federal Government. There is no question about this.

We have been unable to find a single decision indicating or even tending to indicate, that the Federal Government retains title to the tide and submerged lands within the boundaries of the respective states. Every decision we have been able to examine holds clearly to the contrary. We concede nothing in so far as the law is concerned; we express no fear in this respect.

Within recent years, however, certain individuals, some of them occupying places of high authority in the Government, have contended that the Federal Government and not the States and their grantees owns all submerged and tide lands, including all lands filled and reclaimed in the original thirteen states since the adoption of the Federal Constitution, and in the other states since their admission to the Union. They have urged that Congress adopt certain resolutions, of which the Nye Resolution was perhaps the most widely publicised. These resolutions in substance support the claim of these proponents and further included instructions to the United States Attorney General " to institute and maintain to final determination judicial proceedings "; in other words, to invoke the decision of the courts upon the validity of such a claim. What would have been the effect had Congress approved these resolutions? The effect would have been:

1. To have encouraged the overthrow of a basic principle of the American form of Government, because the resolutions called for the violation under the Constitution, of the sovereignty, and for the confiscation of property, of those states possessing submerged and tide lands adjacent to or under territorial waters of the United States.

2. To have hastened an attempt to have had the Government take an aggressive step in the way of claiming absolute ownership in fee to all tide and submerged lands and to all reclaimed lands and all buildings or other structures thereon.

3. To have affected every state which borders on salt water where the tide ebbs and flows and every other state in which there are any navigable waters which would have in turn involved those states so effected in a long and expensive litigation.

4. To have created a cloud upon the title of the states and their municipalities to such lands and to the piers, wharves and other structures thereon, and would have seriously impeded the further proper development of ports upon or adjacent to such submerged and tide lands by either public agencies or private enterprise.

5. To have clouded titles to petroleum properties valued in the hundreds of millions, already sold by certain states to private owners and in the case of the State of Texas to the oil beneath its submerged lands, the proceeds of which have been dedicated to the use of the public schools of that state and in a specific case in California, the oil lying in certain off-shore areas, the proceedings of which have been pledged to harbour development.

6. To have clouded title to all lands filled and reclaimed in the original thirteen states since the adoption of the Federal Constitution, and in all other states since their admission to the Union; and to have clouded title to all buildings and other structures thereon.

This summarises then the effect of these resolutions if they had been adopted.

As you will recall, these resolutions were first introduced in the 75th Congress and subsequently re-introduced in amended form in the first session of the 76th Congress and again amended for re-introduction in the final session. They died with the final session of the 76th Congress and to date (this report was prepared in August, 1941) have not been re-introduced to the current session of Congress.

Before discussing the significance of this, let us bring out this question of oil. Let us examine all the facts. It is important that we do so; particularly inasmuch as some of our membership consider this whole question is purely a matter of oil and concerns only those ports whose submerged lands contain petroleum deposits. This attitude may be due to a failure to realise that the government's claim to submerged petroleum deposits is of necessity dependent upon establishing title to and ownership of all submerged and reclaimed lands whatsoever. At the outset, federal officials placed considerable stress upon the question of petroleum. We quote from the last two paragraphs of a letter dated February 20th, 1939, signed by the Secretary of the Navy, in support of the Nye Resolution:

" It is the opinion of the Navy Department that if the proposed joint resolution is enacted into law it will provide the means by which exploitation will be stopped and prevented, and the petroleum deposits underlying submerged lands adjacent to and along the Coast of the State of California will be conserved for the future use of the Navy in line with the well-established policy of maintaining a naval petroleum reserve in the ground. Such legislation would be in the interest of national defence. The Navy Department recommends that the proposed joint resolution be enacted.

" The proposed joint resolution is in accord with the programme of the President."

We have no quarrel with the United States Navy. We have consistently advocated that if the Navy requires petroleum reserves the Navy should establish them, insofar as the Navy is able to do so; in a legal and constitutional manner.

After all, how can it be a question of oil when less than 2% of the submerged lands contain petroleum deposits; when all submerged lands would be affected by the precedent this type of legislation seeks to establish.

The following conclusions with respect to the petroleum situation are based upon the report of the Special Committee on Submerged and Tide Land Legislation of the California Association of Port Authorities. Their investigation included examination of material compiled from Government records and qualified private sources within the California oil industry. Our conclusions are as follows:—

1. There are two naval oil reserves in California, located in the central western areas. These reserves are capable of producing 750 million barrels of oil, a production the oil industry considers as the equivalent of 7 major oil fields.

(a) Reserve No. 1 embracing the great Elk Hills oil field comprises a total area of 38,000 acres, of which the Navy controls 86%. This reserve is capable of producting 600 million barrels.

(b) Reserve No. 2 covers portion of the large Buena Vista Hills oil fields. It cannot in truth be deemed a reserve, because the Government's holdings amount to about one-third of the area. The Government is, therefore, compelled to compete in producing its share of the oil in order to prevent its capture by adjoining fee land owners. Reserve No. 2 is capable of producing 150 million barrels.

2. Coastal oil fields of California, which are the areas in question, lie partly on shore and partly beneath the sea. Each was discovered by operations first conducted on land. Thus each such

*From Proceedings of Thirtieth Annual Convention, 1941.

†The exhibits, which give detailed documented support to the contentions in the Report, are not reproduced.

The Ownership of Tidal Lands in the United States

(continued)

oil field has both upland and submerged land within its boundaries. As in Naval Reserve No. 2, even though the Federal Government or the United States Navy should succeed to the ownership of those portions under the sea in these fields, it would be necessary to produce oil in a competitive manner to prevent drainage resulting from upland lease operations taking all the oil beneath the submerged lands. Thus no true reserve can be created from these coastal oil field areas; in fact it is incumbent upon the owners of the submerged lands in these coastal fields to operate such properties to protect their interests.

3. As of January 1st, 1938, it was estimated that the total expected production from submerged land areas in California then known would amount to some 137 million barrels, a little less it will be noted than the expected recovery from the so-called Naval Reserve No. 2. But already some 62 million barrels have been taken in production, leaving an estimated 75 million barrels of crude oil yet to be recovered. This was the condition as of January 1st, 1941.

In the light of such facts it appears that the limited amount of oil and the circumstances which render it useless for Naval Reserve purposes lying in the off-shore areas of California does not form a condition upon which to justify an attack of title.

Many resolutions in opposition to the Nye and kindred resolutions have been adopted by state legislatures and by various associations. These have been read into the record of Congress and placed in the hands of high government officials. Your Committee has furnished innumerable maps and data. It has in the past and is continuing to be a clearing house for information on this subject, but more importantly it has made every effort to properly inform the right people. We believe the record speaks for itself. We are cognisant, however, that numerous of our membership are not as informed upon this subject as they should be; that they have not given this subject the consideration its seriousness demands.

Ordinarily, the statement that these resolutions have not been to date, nor are likely to be, reintroduced in this session of Congress would support the conclusion that the work of this Special Committee was finished. Unfortunately this is not the situation for the idea embodied in these resolutions continues to have support. Since the first of the year your Committee has been active in an attempt to curb the agitation of this claim and is now in a position to announce that for the past recent months it appears that the Committee's efforts have been successful. We believe this is significant but nevertheless we can ill afford to let the present situation lull us to sleep. We are reliably advised to watch our step; that this programme may be revived at any time. There is a ray of hope, however, to be found in the attitude of the Solicitor General who has consistently insisted upon a Congressional Declaration before he will institute legal proceedings.

All of us must therefore continue every reasonable precaution against the possibility of this question again occupying the attention of Congress. We must recognise that in the atmosphere of war hysteria which surrounds official Washington our position is vulnerable should this question be raised as an issue of national defence. It might well prove to be a case of action first and thinking afterwards.

Our protection lies in knowledge of this subject. We may be called upon—and hurriedly—to reach our Senators and respective Congressmen. When that time comes we must be fully informed. Without knowledge of this subject how can we expect to influence Congress, a Congress already harassed by untold problems which a war condition creates. How can we expect to convince them of the effect of such legislation will have upon our title. It will be up to us to tell Congress who owns the waterfront of America and why, and what it would mean to lose that ownership.

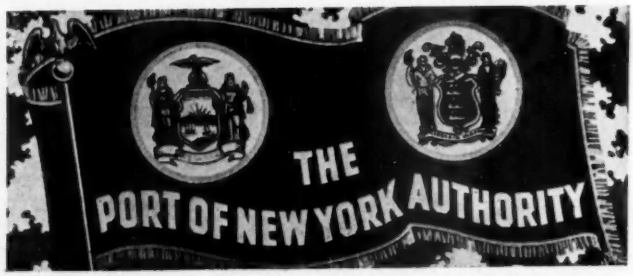
This Special Committee on Submerged and Reclaimed Land Legislation was created in 1938 and has been continued from year to year by resolutions adopted at each Annual Meeting of the Association. Experience has shown that the problem is not a temporary problem but a permanent one. It must be assumed that for an indefinite time in the future, legislative proposals will be made to Congress in an effort to justify the seizure of submerged and reclaimed lands by federal authorities without due compensation. Accordingly, your Committee recommends that the Special Committee on Submerged and Reclaimed Land Legislation be made a permanent Standing Committee of the Association, and to that end, that paragraph XIV of the By-Laws be amended by adding thereto the following:—

" XIV. Committee on Submerged and Reclaimed Land Legislation—which shall oppose on behalf of the Association any bills or resolutions which may be introduced in the Congress of the United States under which the Federal Government claims, directly or indirectly, title to or any rights in lands under water within the territorial limits of the several states (or in any petroleum or mineral deposits in such lands)."

The Port of New York Authority

Twenty-first Anniversary of Formation

The 21st milestone in the history of the Port of New York Authority was passed on April 30th last. " But," says *The P. A. Diary*, the official journal " for Port Authority Employees," a copy of the May, 1942, issue of which has recently reached the office of *The Dock and Harbour Authority*, " the roots really extend way back yonder before the first World War, and it may be suggested that the 25th anniversary of actual port co-operation between New York and New Jersey really falls on May 8th.



Flag of the Port of New York Authority.

" It was on the latter day that the New York State legislation became a law with the approval of Governor Charles S. Whitman, creating the New York New Jersey Port and Harbour Development Commission. The corresponding act in New Jersey already had been passed and signed by Governor Walter E. Edge on March 26th, 1917. It was the New York, New Jersey Port and Harbour Development Commission that was charged with the responsibility of enquiring into port conditions and with submitting ' a comprehensive report recommending the proper policy that shall be pursued for the best interests of the entire Port of New York and the legislation, State and Federal, that will be necessary to make such recommendations effective.'

" The Commission undertook its work with enthusiasm and public and political support. As a result of its studies, extensive plans were prepared, and a final report presented to the two States on December 16th, 1920. The manner in which to make its recommendations effective and to ensure co-operation between the two States, the Port and Harbour Development Commission concluded, was for New York and New Jersey to establish an agency under the compact clause of the Federal Constitution to be known as The Port of New York Authority.

" The treaty carrying this plan into effect was signed by representatives of the two States on April 30th, 1921."

The P. A. Diary is an interesting monthly publication containing items of news of local port interest, particularly as regards members of the staff. The illustration here reproduced shows the flag of the Port Authority. It has a blue field with white lettering, and includes the official seals in four colours of the States of New York and New Jersey.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this Journal should not be taken as an indication that they are necessarily available for export.

Timbers for Maritime Structures

Selection, Preservation and Fire-Proofing: War-time Problems

By ERIC HARDY, F.Z.S.

The present difficulty in obtaining supplies of many imported timbers and their cost and short supply will affect dock and harbour work, as there are only four or five British-grown timbers which are of much use in this class of timber work, apart from shed and and warehouse building, so that every effort should be made to give adequate protection to dock timber against fire, dry rot and timber-boring pests, by adequate chemical preservation. There were good stocks of Burma teak in this country at the outbreak of the Japanese war, so that this timber may continue to be available for bridge-decking and similar harbour structures. There is, however, considerable uncertainty over the future of supplies of such useful eastern woods as pyinkado, which served a very good purpose for landing stages, wharf piling, deck work and bridge work, and of East Indian satinwood, a well-known timber in Ceylon and India, for piles and bridges. Our home fellings, which are now reaching almost their maximum output, can supply larch, our most durable timber for jetty and wharf walling and piling; Scots pine, which is little inferior to pre-war maritime pine for pile and wharf construction; English oak, which, if heartwood, is very sound and durable for dock gates, English elm (not Dutch elm) which is very durable under water for piles and general dock and wharf construction, sea groynes, fenders, and rubbing timber; and Douglas fir which, however, is somewhat inferior to the American variety for wharves, piling and bridges.

As greenheart somes from South America (British Guiana) the future of supplies is not directly imperilled, while from North America, rock elm comes in useful for fenders and belting or rubbing strips. When available, Tasmanian oak (actually one of the eucalyptus group) is very good for piles and bridges, being hard, strong, elastic and resilient, very durable, if preserved, and with a life of 20 to 25 years in bridge construction. Jarrah moule and rock-elm are also valuable for harbour work. South American angelique can replace teak in many jobs and Indian jarrah and anjan are second to teak for durability.

In preserving timber against fires during air raids, it is well to be able to give the wood a thorough soaking with a really blitz-proof, fire-resisting chemical before it is erected, and to ensure deep penetration, or to brush or spray it well into the wood and, where the wood is exposed, to take precautions against leeching during rain. There are very few fire-proofing chemicals that are of any real blitz value, and the best consist of either of the following: Diammonium phosphate, monoammonium phosphate, phosphoric acid, or monobasic magnesium phosphate. Asbestos paints have also served well in the raids on London, but it should also be borne in mind that some timbers, like larch and pine, are very inflammable, and others like teak, karri and jarrah have a high natural resistance to fire. Australian karri (another eucalyptus) is well known in harbour construction work, providing it is not used under water, and karri superstructures of wharves and jetties remain sound for more than 20 years, although piling lasts only from one to eight years. Its resistance to fire is seldom equalled and in a serious fire at the West India Docks, London, before the war, karri planks received only a thin charring on the outside.

The life of most timbers can be extended threefold, sometimes five times, by the proper use of creosote or some other antiseptic against dry rot fungus, which is much more destructive than timber-boring beetles. But the preservation has to be done properly and some timbers, like larch and karri, are very difficult to treat. Again, it is well to treat the timber before erection if possible, and a very good simple method is to boil pine in tanks of creosote of at least 40% naphthalene fractions, for an hour or two at 180 to 200% fahr., and then leave the timber in the creosote overnight as it cools down. There are many other preservatives, and coal tar oils heated to 140 to 180° are good, although perhaps more expensive; if the timber is in position, two coats of hot creosote at 140° fahr. may be painted on. Such chemicals as 2% Wolman salts, 2% sodium fluoride, copper sulphate, and zinc chloride are only suitable for indoor timber not exposed to rain, which washes them out again. The Powellising process is suitable for karri and other timbers difficult to penetrate with creosote: it consists of boiling the green timber in a solution of molasses and arsenic. The Australian fluorising treatment means boiling in an open tank of an aqueous solution of arsenic, sodium fluoride and sodium dinitrophenate. Most of these preservative treatments also increase the wood's resistance to fire.

With oak and many other timbers famous for their durability, it is only the heartwood which has great durability, and where samples include much sapwood, as in pine poles, this must be creosoted to maintain the full durability. The light sapwood is always easier to penetrate than is the dark heartwood. The Americans have perfected a new pressure process for creosoting pine poles in closed cylinders of compressed air. At a pressure of 85 lbs. per sq. in. some of the air enters the cells of the wood when hot creosote is pumped in to fill the cylinder, the pressure being maintained and for 3 hours creosote is pumped in to reach a pressure of 135 lbs. per sq. in., when it fills the wood cells. Air pressure is then released to create a vacuum, when the excess creosote brought to the surface is pumped out; after an hour the vacuum is closed and steam at 20 lbs. per sq. in. and 260° fahr admitted and maintained for 3 hours to increase fluidity of the remaining creosote.

Russian Scots pine, larch and oak brought as ballast from the Murmansk arms route is first-class building timber, famous for its mild nature, and graded better than any other timber expert in the world. Russian red and white softwoods are excellent for planing and are in large sizes free from knots: they are unrivalled for conversion timber, with remarkably straight grain and mild nature, and they do not warp so easily as timber of a stronger nature from other countries.

Timber insect pests causing damage are chiefly the American powder post beetles in newly-seasoned hardwoods (not conifers), but they attack only the dry sapwood, not the heartwood, and if the timber is kiln-heated to 130 ° fahr. when acquired from a timber yard harbouring this pest, it should be sufficiently sterilised. Death-watch often infests roof timbers following dry rot presence, and adequate ventilation is a good precaution as it reduces humidity and warmth which encourage timber insects. Mercuric salts, sodium flouride and zinc chloride, or even hot creosote, are good preservatives against beetle damage if applied to the wood by pressure before erection. But as with fire-proofing and safeguarding against dry rot, the choice of wood with regard to natural immunity is a big advantage. Timbers to be used in the tropics, needing a good natural resistance to termites include jarrah, western red cedar, obeche, iroko, satinwood, teak, thitka, pyinkado, haldu, kauri pine, greenheart and Port Orford cedar, while good chemical preservatives against this pest include 0.25% sodium flouride, 1% zinc chloride, 0.5% sodium dichromate, 0.5% chromic chloride, and 0.42% zinc silicofluoride. But as with precautions against any dry rot, timber should not be in direct contact with the ground, but on metal, brick, stone or concrete foundations.

The timbers with good natural resistance to dry rot decay include larch, Port Orford cedar, oak heartwood, western red cedar, jarrah, kauri pine, teak, red elm, rock elm and western hemlock. Harbour pile timbering which has a high natural resistance to marine borers like Teredo, include Australian turpentine (which has had 75 years' life in the Philippines), pyinkado heartwood, greenheart (the Canada Dock gates, Liverpool, were sound after 60 years with only gas tar protection and the Tyne piers after 20 years),* Manbarklak (which has survived over 75 years at Maracaibo, Dutch Guiana), Indian acle, alder, Australian cypress-pine red gum, sugar gum, broad-leaved water-gum, Borneo ironwood, red mahogany, N. Z. yew or totara, billian, malabayabas and toledo. High resistance to decay is generally due to the presence of silica crystals in the cells, as in the latter woods, or to great hardness like jarrah, to natural oils, like teak, or to resins like larch. Red cedar, Port Orford cedar and redwoods are not immune to teredoes, nor is timber like karri, even when treated with the Powell process, but quite good natural resistance, even if inferior to the foregoing list, is shown by jarrah, African azobe, Australian and New Zealand

*As regards the Canada Dock gates, it should be pointed out that, owing to sewage pollution, the Mersey water has been remarkably free from "Teredo."—Editor.

Timber for Marine Structures—continued

taora, matai, grey box, iron bark, red gum, tallow wood, liusin or cretalingum, aranga, betis, dungon and molare (see Alexander Howard's " Timbers of the World "). Pine, oak and Douglas fir piles seldom live more than a couple of years in the sea without preservation with creosote or tar oil distillates, chlorimyl arsenious oxide, phenyl arsenious oxide, mercuric oxide or arsenate, cuprous cyanide or mercuric arsenate, providing precautions are taken to prevent leeching of the chemical into the sea and to protect the outside of the timber from puncture by rubbing vessels, battering, or gales. Creosote is not such good protection for piles against marine borers in tropical seas and it gives only 8 or 9 years' service in the Pacific and Caribbean harbours (see the San Francisco Harbour Commissioners' Report on pile preservation).

There is no doubt that with proper attention and preservation against dry rot, beetle borer, teredo or other marine borers and fire, 50% of timber loss and replacement costs can be reduced, and in the war-time timber shortage this is essential.

Cochin Port

Excerpts from Administration Report for the Year ended 31st March, 1941

Finance and Trade.—Trade conditions during the year were shaped by the war. The loss of European markets, imports and exports contral, exchange restrictions, scarcity of cargo space and the dislocation of the normal trade channels affected the Cochin Port's oversea trade during the period. There was a general shrinkage in the volume of imports and exports, and the progressive trend noticed in the preceding three years suffered a setback. The decrease in the tonnage of cargo handled and the steady decline in the tonnage of shipping arrivals substantially reduced the Port's revenue, while at the same time there were additional working costs by reason of the operation and maintenance of the new facilities.

Revenue Account.—The financial result showed a loss on the year's working, the excess of expenditure over income being Rs. 1.25 lakhs against an anticipated excess of Rs. 1.73 lakhs according to the revised estimates. The deficit in this Account in the previous year was Rs. 2.02 lakhs.

Revenue Receipts.—The ordinary Revenue Receipts of the year under the General and the Pilotage Accounts aggregated Rs. 12.51 lakhs against Rs. 13.91 lakhs in the previous year.

The ordinary income includes a sum of Rs. 0.11 lakh being the net earnings of the Harbour Railway for the period 1st July, 1940 (the date when the railway was opened for public goods traffic), up to 30th September, 1940. The net earnings for the remainder of the year were receivable in 1941-42.

Revenue Expenditure.—The Revenue Account expenditure on ordinary items was Rs. 9.31 lakhs against Rs. 8.43 lakhs in the preceding year.

The special expenditure incurred during the year amounted to Rs. 0.83 lakh compared with Rs. 0.18 lakh in the previous year. The increase was due to the execution of certain capital works financed from Revenue and the transfer of " suspense " from the fourth stage account to the Revenue Account.

Working Expenses.—Excluding (i) the contributions to the Capital Account and to the reserve funds, (ii) debt charges and (iii) stock suspense, the actual working expenses for the year represented nearly 72% of the ordinary income under the Revenue General Account. This high ratio was attributable to the fall in receipts consequent on the reduction of cargo and shipping tonnage, and partly to the very limited use of the new facilities.

Loans.—The Port's borrowing for capital works during the year amounted to Rs. 1.32 lakhs.

Revenue Balances.—The Revenue Account excluding the Pilotage Fund closed with a cash balance of Rs. 4.33 lakhs on 31st March, 1941. This is apart from investments in Government Securities of Rs. 1.86 lakhs at cost.

The closing balance in the Pilotage Account was Rs. 0.07 lakh against Rs. 0.22 lakh in the previous year.

Capital Account.—The expenditure on Capital Account during the year was Rs. 5.37 lakhs.

Trade.—Owing to the war, statistics of traffic and the detailed review of the Port's trade are withheld.

Engineering.—Practically all the capital works comprised in the initial instalment of the fourth stage of development of the harbour were completed during the year. Concrete road surfacing was laid over the Mattancherry Road Bridge and the bridge opened for traffic in May, 1940. The erection of the lift span towers and machinery was finished later, and the bridge was completed in all respects by December. In addition to serving as a feeder to the Port's trade, the provision of the bridge has established through road communication between the mainland and the Willingdon Island, Mattancherry and Cochin.

The railway station premises, goods shed, staff quarters, terminal facilities such as weighbridge, engine shed, turntable, ash pits and drop pits, and the floodlighting of the yards were completed. The construction of the low wharf for lighters with shedding accommodation for the use of the backwater traffic was completed. Engineering maintenance was carried out as necessary, the more important items being cleaning up of the approach and the inner channels and the turning basin.

Marine Surveys.—Soundings were taken at regular intervals in the harbour and the approach channel to ensure that the necessary depths were maintained.

Mud Banks.—Observations and the surveys of the movement of the mud banks along the coast were continued during the year and a report on the subject was submitted to Government.

General.—The Harbour Railway, which was constructed in order to connect the new harbour premises on Willingdon Island with the mainland and the Cochin Railway, was opened for goods traffic on 1st July, 1940. After the usual inspection by the Senior Government Inspector of Railways, Seventh Circle, its opening for the public carriage of passengers was authorised with effect from 1st October. The working of the Harbour Railway was entrusted to the South Indian Railway.

Cochin Harbour Advisory Committee.—Six meetings of the Harbour Advisory Committee, including the special budget meeting were held during the year and were well attended by the members.

Mr. (now Sir) R. C. Bristow, C.I.E., M.Inst.C.E., M.I.Mech.E., the Administrative Officer, proceeded on leave preparatory to retirement from 8th March, 1941, afternoon and Mr. A. G. Milne, M.Inst.C.E., M.I.Mech.E., the Chief Engineer, took over the duties of the Administrative Officer.

The Report is signed by Mr. A. G. Milne, Administrative Officer.

The Functions of a Regional Port Director

Mr. D. Bulay-Watson, Regional Port Director for the Humber Area, was the principal guest of the Hull Traffic Association at a recent luncheon. He said the Hull Traffic Association was one of the most important bodies in the city, because Hull was not a city of one industry, but had many varied industries, the chief of which was transport. He was there to exercise the powers vested in him by the Minister of War Transport under the Defence of the Realm regulations and to issue instructions to responsible persons for regulating and expediting traffic. The R.P.D.'s functions were to see to the most rapid clearance of goods from the ports, both inward and outward, the best utilisation of the transport facilities within and outside the port to deal with storage, and also labour problems. In the latter respect the port director was not an adjudicator, but merely a co-ordinator.

Rules and regulations were made to apply universally, yet circumstances which might suit Hull would not necessarily operate smoothly at other ports. The Regional Port Director had the opportunity of slightly altering the regulations to suit local conditions at the port and make for smooth working. Regarding the question of on-carrying, Mr. Bulay-Watson emphasised that it was desirable that they should use the canals first, the railways second and roads third. This was because there was no wear and tear and less fuel used on the canals. The railways used home-produced coal, and the roads, imported oil and rubber.

Notes of the Month

Danish Harbour Extension.

Considerable extensions estimated to cost 280,000 kroner, are projected at the harbour of Havnsö in the Island of Zealand, Denmark.

Thames Conservancy Appointment.

In place of Mr. G. C. Gorble, who has retired after 35 years' service, Mr. G. E. Walker, Solicitor to the Thames Conservancy Board, has been appointed Secretary and Solicitor.

Tees Conservancy Commission.

The vacancy on the Board of the Tees Conservancy, caused by the death of Alderman W. F. Whitwell, has been filled by the election of Mr. William Hedley.

Port of Kalundborg Finances.

A report for the financial year 1941-42, published by the Danish Harbour Board of Kalundborg, shows that the year ended with a deficit of 118,094 kroner. Receipts from harbour and quay dues were 63,000 kroner less than had been estimated.

Tyne Navigation Commission.

The Tyne Navigation Commissioners have authorised the construction at their principal docks of a clock tower, estimated to cost £250, with a wide range of visibility from neighbouring quays. It is considered that the expense is justifiable in view of the assistance given to dock workers in time-keeping. A recent press report states that a survey of Tyne trade during the first half of the year gives ground for a certain amount of satisfaction. Compared with the corresponding period of 1941, revenue has been well maintained and expenditure adjusted to coincide with it. Coastwise coal shipments were slightly better, on the whole, despite occasional decreases in individual instances. Various additions are being made to quayside equipment, such as cranes of 5 tons' capacity for general cargo handling and 2-ton electric trucks for transit shed work.

A Dockside Delinquent.

A Tyneside labourer was recently committed to prison by the Jarrow magistrates on charges of absenteeism and irregular time-keeping. Defendant had nothing to say in answer to evidence that he had lost 62½ hours between May 10th and June 20th and that he had worked for only about three months in three years and had lived on his parents and his benefits. The only excuses he had made when interviewed were that he had suffered from colds and was tired. The chairman of the bench of magistrates gave it as his opinion that if the convicted man did not work regularly in future, the authorities should see about putting him in the army.

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Galway Dock Gates.

Electrically operated gates which have been re-constructed for the entrance to the Galway Dock were recently put into commission. Vessels of 5,000 tons burthen are now able to enter and leave the port at all stages of the tide.

Cape Town Dry Dock.

It has now been officially announced by the Ministry of Railways and Harbours in the Union of South Africa, that the new graving dock at Cape Town is to have dimensions, as follows: Length, 1,200-ft.; width, 150-ft.; and depth of water over sill, 45-ft.

Leith Harbour Commission.

A Government order has been issued stating that Commissioners of the Port of Leith elected by shipowners and ratepayers, who are due to retire in November, shall continue in office until November, 1945. The elections will, accordingly, be postponed and no poll register will be prepared this year.

Karachi Port Returns.

For the nine months ended 31st December last, the gross total of imports and exports was 1,530.476 tons as against 1,457,670 tons for the corresponding period last year. The receipts for the period were 68,05,208 rupees compared with the budget estimate of 66,67,245 rupees.

Distinction for Port Authority Member.

Alderman Colonel A. C. Davis, D.L., J.P., has been elected a Sheriff of the City of London. Alderman Davis has been a member of the Port of London Authority since 1928, when he was first elected as one of the representatives of the merchants of the port ("Goods," as apart from "Ships"). He has been returned at each subsequent triennial election.

Salvage of a Large Floating Dock.

A floating dock of 10,000 tons lifting capacity, scuttled with explosives by the Italians at the Port of Massawa, Eritrea, just prior to the capture of the place by British forces in 1941, has been successfully raised and repaired. The work was carried out under the direction of Captain Edward Ellsberg, of the United States Navy, who was responsible, in 1925, for salving the American submarine, U 51, off Block Island, part of the State of Rhode Island. Captain Ellsberg has expressed his confidence that 26 Italian and German ships and a smaller dry dock, also lying sunk in the harbour, can be salved and restored to service. Among the vessels are two 14,000 ton German passenger ships, the others being mostly of the 5,000-ton freighter-passenger type.

Durability of Aluminous Cement in Sea Water.

The following testimony to the durability of aluminous cement in a maritime environment is extracted from the August, 1942, issue of *Concrete and Constructional Engineering:*

A little over 10 years ago the Halifax (Nova Scotia) Harbour Commissioners were faced with the problem of replacing a harbour pier which had, in the space of eleven years, decayed through the combined actions of sea-water and ice conditions. "Ciment Fondu" aluminous cement was chosen for the new work and an order (value £120,000) was placed with Lafarge Aluminous Cement Co., Ltd., on condition that the company guaranteed that this cement would not deteriorate under the severe conditions. The manufacturers agreed to deposit a financial guarantee for a period of 10 years; the pier (which is a quarter-of-a-mile long) was built, and now, the 10 years having expired, the amount of the guarantee has been refunded.

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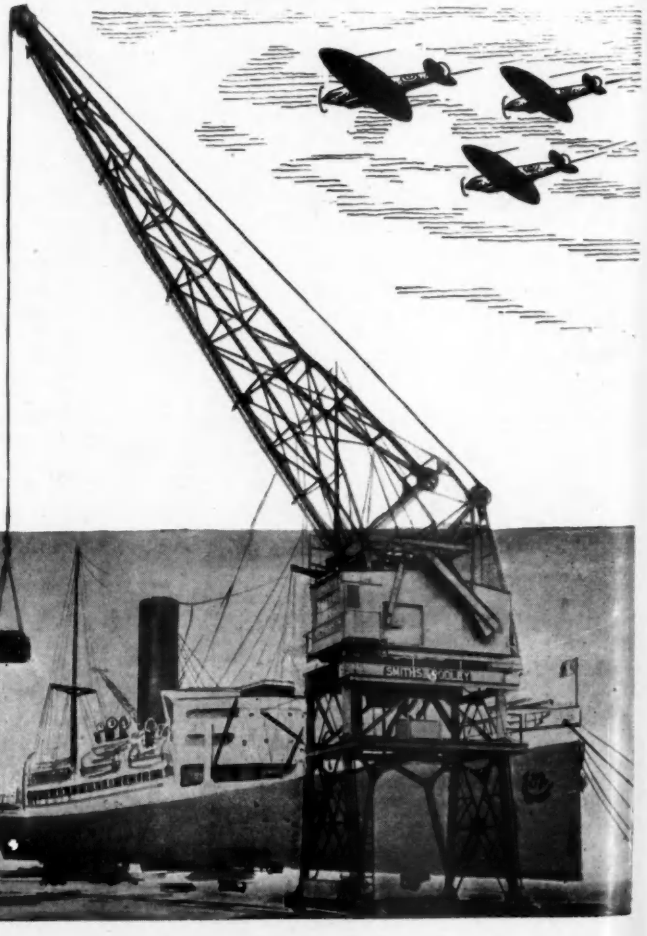

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